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USDA PERSPECTIVE ON THE OUTLOOK FOR COTTON

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Agricultural Economists, USDA

The theme of this 77th Agricultural Outlook Forum, "Farm and Policy Prospects," seems appropriate as agriculture embarks on the 21st century under a new Administration. The policy debate on the shape of future cotton farm policy began with last week's hearings in the House of Representatives, and the discussion is influenced by a number of contradictions in the current cotton situation. World cotton consumption is estimated at record levels for both the past and present season but, after rebounding from 1999/2000's 25-year low, cotton prices have fallen in recent months. In the United States, consumers have continued to increase purchases of cotton products, yet domestic mill use of cotton is expected to reach a 9-year low in 2000/01. And, despite higher average market prices, farm income is likely to decline this season, due to a reduction in government payments which more than offsets the higher market returns. However, lower income levels have not dampened farmers' enthusiasm for cotton, and planted area is forecast to rise this spring.

As planting time approaches once again, 2001 is shaping up to be another intriguing year for cotton. But before addressing the upcoming 2001/02 season, a brief review of the latest 2000/01 supply and demand estimates in the United States and abroad is presented.

2000/01 World Cotton Situation

The world cotton situation for 2000/01 is characterized by larger production that is more than offset by higher consumption and as a result, ending stocks are reduced further to their lowest level in 5 years. Record world yields are expected to increase global output 1 percent to 88.1 million bales. However, the continued strength of world cotton consumption—estimated at 92.1 million bales—is forecast to push world stocks 9 percent, or 3.7 million bales lower. World prices have responded as the A-Index has risen 10 cents thus far this season, compared with the 1999/2000 marketing year average.

2000/01 U.S. Cotton Situation

U.S. Area, Yield, and Production

As planting time approached for the 2000 crop, cotton prices were slightly better than the previous year. However, prices for competing crops—like corn and soybeans—were also above year-earlier levels but did little to attract area away from cotton. And in the end, the cotton marketing loan program—which supplied a significant portion of cotton producers' incomes in 1999—and the insurance program available to producers provided the incentive for U.S. farmers to plant additional area to cotton in 2000.

The flexibility provisions and favorable springtime weather allowed producers to plant more than 15.5 million acres this season, 4.5 percent above 1999 and the highest since 1995. Upland area in 2000 was near 15.4 million acres, up from 14.6 million a year ago. In contrast, extra-long staple (ELS) area declined substantially to 172,000 acres, a 40-percent drop in acreage from 1999. Last season's record yield provided an ELS crop well above demand and more than doubled stocks, creating the incentive to move some ELS area into upland in 2000. But despite the increase in total area in 2000, the national average abandonment rate was well above last season at nearly 16 percent, or 2.4 million acres. With the higher abandonment, harvested area, at 13.1 million acres, was below that of 1999.

U.S. cotton production in 2000/01 is estimated at 17.2 million bales, slightly above last season's 17.0 million. With the smaller harvested area this season, the production gain is attributable to a rebound in the national average yield. The U.S. cotton yield is estimated at 631 pounds per harvested acre, 24 pounds above last season but below the 10-year average of 644 pounds.

Upland production for 2000 is currently estimated at 16.8 million bales, with the average yield estimated at 625 pounds per harvested acre, both above last season. While expected production is higher in all regions this season except the Southwest, yields were mixed as drought conditions across parts of the Cottonbelt once again affected output. ELS production is forecast at 398,000 bales, 40 percent below 1999. The decline in the ELS crop is attributable to lower acreage, as yields were similar. The ELS yield is estimated at 1,119 pounds per harvested acre, below only the record of 1,128 pounds in 1999.

U.S. Mill Use and Exports

The 2000/01 demand outlook points to a decline in total U.S. cotton offtake from last season. Total demand is projected at 16.7 million bales, 2 percent below 1999/2000 and about 4 percent below the 5-year average. The decrease in this season's demand prospects is attributable to lower mill use as exports are forecast above a year ago. U.S. cotton mill consumption is projected to fall 5 percent this season to the lowest level in 9 years. The latest estimate places 2000/01 mill use at 9.7 million bales, 500,000 bales below last season. The continued growth of U.S. textile and apparel imports has placed tremendous pressure on the U.S. spinning industry over the last several years and continues this season. At the same time, a weakening of the economy has stifled growth in retail cotton consumption, exacerbating the effects of competition from textile imports. As a result, some mills have been forced to limit output, relocate, or close altogether. Upland mill use in 2000/01 is currently projected at approximately 9.6 million bales, while ELS consumption is expected to reach 130,000 bales.

Based on the first 5 months of data from the Department of Commerce, the seasonally adjusted annual rate of cotton consumption averaged nearly 9.7 million bales. Actual cotton mill use for August through December 2000 reached 3.97 million bales, compared with 4.21 million a year earlier. Cotton use has declined 6 percent, while manmade fiber use on the cotton system has fallen 9 percent during the comparable period as growth in consumer demand for all fibers has slowed. As a result, cotton's share of fiber use on the cotton system has risen above that of last season. During the first 5 months of 2000/01, cotton's share averaged 79.2 percent, compared with 1999/2000's 78.4 percent.

Aiding both cotton consumption and share is the continued success of U.S. cotton textile exports that is associated with regional trade agreements like NAFTA and CBI. For calendar 2000, cotton textile exports rose for the 17th consecutive year, reaching 5.1 million bale-equivalents (2.4 billion pounds), nearly 18 percent above 1999. At the same time, however, the strong U.S. dollar contributed to the expansion in cotton textile imports that totaled 15.8 million bale-equivalents (7.6 billion pounds) in 2000, 13 percent above 1999. With textile imports rising more than exports, the 2000 cotton textile trade deficit continued its 6-year expansion. The deficit approached the equivalent of 10.8 million bales of raw cotton, nearly double the 1993 level. Meanwhile, total domestic cotton consumption (mill use plus net textile trade) advanced for 4th consecutive year, with per capita consumption increasing from 1999's 35 pounds to 36 pounds in 2000. However, slightly less than half of this total is being produced in U.S. mills.

Meanwhile, U.S. exports are projected to continue their rebound this season from 1998/99's decade-low shipments. Exports are now projected at 7 million bales, 3 percent above 1999/2000 but below early-season expectations. Upland exports are expected to account for most of the gain, rising to more than 6.5 million, and ELS shipments are forecast to rise slightly to 460,000 bales, near the 1996 record. However, total commitments (shipments plus outstanding sales) for 2000/01 are lagging the pace set last season. Upland commitments through early February were 5.2 million bales, compared with 5.9 million in 1999/2000. On the other hand, ELS commitments and shipments are running ahead of last season's pace.

A number of factors have contributed to the sluggish pace of U.S. export sales thus far this season. Foreign cotton consumption is projected to rise slightly from last year's level, with significant increases forecast for China, Brazil, and Russia. China's restrictive import policy, Brazil's larger production, and Russia's proximity to the cotton-producing countries of Central Asia restrict the U.S. share of these markets. At the same time, consumption is forecast to decline in several importing countries that traditionally are customers of U.S. cotton, especially Turkey, Taiwan, Mexico, and Korea.

In addition to the geographic shift in consumption patterns, concerns about textile demand—especially in the large U.S. retail market—has made foreign mills more cautious about acquiring inventories of raw materials, and

prospects for large Southern Hemisphere crops have encouraged hand-to-mouth buying. Also, the strong U.S. dollar has given Australian cotton, which can be hedged on the New York futures market and then sold in the weaker Australian currency, a definite competitive edge. Despite these factors, the U.S. share of the global export market is projected to grow for the second consecutive year this season to 26 percent, up from 25 percent in 1999/2000 and 18 percent in 1998/99.

U.S. Supply, Stocks and Farm Income

U.S. cotton supplies at the beginning of 2000/01 were 3.9 million bales, nearly identical to the previous three seasons. Also similar to 1999/2000, U.S. supplies are once again expected to include only a small quantity of imported cotton. During the first 5 months of this season, imports have reached only 8,000 bales, with the majority ELS cotton from Egypt. Raw cotton imports are projected at only 30,000 bales for the season, below the 97,000 bales imported in 1999/2000. Including imports, total U.S. cotton supply in 2000/01 is projected at 21.2 million bales, marginally above last season.

Based on these projections of U.S. cotton supply and demand, ending stocks for the 2000/01 season are estimated at 4.5 million bales, the largest since 1992/93. With U.S. stocks anticipated to jump nearly 600,000 bales from the beginning level, the ratio of stocks-to-use is projected at 26.9 percent, compared with the previous 5-year average of 21.3 percent. While upland stocks are expected to leap to 4.4 million bales this season, ELS stocks are projected to drop dramatically due to the substantial reduction in both area and production.

While upland farm prices fell to a 25-year low in 1999/2000, upland gross farm income rose about 13 percent to \$6.9 billion due to a sharp increase in government payments. Of total income, regular and supplemental AMTA payments together with marketing loan benefits totaled about \$2.9 billion. On a per-acre basis, market returns were barely sufficient to cover 1999-crop variable costs, but government payments raised the average net return to an estimated \$203 per acre. Returns from the market have risen with higher prices in 2000/01 but, at the same time, lower levels of government support have reduced total producer returns. Gross farm income for the 2000 crop is estimated at \$6.6 billion, including government payments of \$1.6 billion. Net returns over variable costs are estimated at \$142 per planted acre, down about 30 percent.

2000/01 Foreign Cotton Situation

Foreign Area, Yield, and Production

Foreign production rose less than 1 percent from the year before in 2000/01, a 600,000-bale gain to 70.8 million bales. A substantial gain in China's production, and larger crops in Brazil, Argentina, Paraguay, and Syria were just about offset by smaller crops in Uzbekistan, West Africa's Franc Zone, India, Pakistan, and Mexico.

After falling below 19 million bales for the first time since 1993, China's production rebounded in 2000/01, climbing 2.4 million bales from the year before to 20 million bales. While the final assessment of the crop by China's National Bureau of Statistics is still months away, current information suggests both area and yields rose during 2000/01. Procurement prices rose steadily during the latter half of China's 1999/2000 marketing year and agricultural policies detrimental to enthusiasm for grain production in China were announced. The availability of genetically engineered cotton also permitted some eastern regions previously devastated by bollworm infestations to begin returning to the cultivation of cotton. China's cotton area in 2000/01 is estimated at 4 million hectares, 300,000 hectares above its 1999/2000 level, but nonetheless the second lowest since 1963, and 300,000 below the average of the preceding 3 years. Yields however were a record high, 6 percent above the year before, and 65 percent higher than in 1992 when the bollworm's impact on China's output was at its height.

Southern Hemisphere production finally surpassed its 1990/91 record 9.1 million bales in 2000/01, jumping 1.9 million bales to 10 million as a number of countries responded to rebounding prices. While Northern Hemisphere planting decisions for 2000/01 came shortly after cotton prices hit 25-year lows, Southern Hemisphere producers were able to respond to the opportunities presented by a 37-percent increase in the A-Index between December 1999 and May 2000. Thus, while Mexico's crop declined nearly 300,000 bales, Latin America's total production rose nearly 900,000 bales due to larger crops in South America.

Paraguay and Argentina are estimated to have increased output by about 200,000 and 300,000 bales, respectively, compared with the year before in 2000/01, but the largest gain is forecast for Brazil. Brazil's output in 2000/01 is estimated 600,000 bales higher than the year before, and at 3.7 million bales is estimated to be its highest since 1984/85. Brazil's cotton output has increased 188 percent since 1996 as Brazil made the transition from declining hand-picked harvests in Parana and Sao Paulo during the first half of the decade to a surge in the mechanized crops of Mato Grosso and northern Bahia since 1996. Brazil's total cotton area is currently well below its earlier levels, but extremely favorable conditions in the new producing regions means Brazil's average yield has soared 120 percent since 1996.

In contrast with South America, cotton producers in West Africa's Franc Zone suffered perhaps their biggest setback ever in 2000/01, as production fell nearly 600,000 bales. Several years of low prices have hampered the ability of the region's parastatals to provide the region's farmers with farm inputs and timely payments for crops. Area fell more than 300,000 hectares to a four-year low, and output fell for the third consecutive year.

In Central Asia, 2000/01 output fell more than 900,000 bales from the year before, largely due to weather. Yields fell to post-Soviet-era lows as several years of regional drought hampered irrigation and then late-season torrential rains hit Uzbekistan. Pakistan also suffered from reduced irrigation supplies, and output is estimated down 500,000 bales to 8.1 million bales.

Weather also helped reduce India's crop in 2000/01 as a poor monsoon reduced plantings and yields in Gujarat even below 1999/2000's reduced levels. Cotton prices in India declined during 1999/2000, further reducing India's cotton area, down nearly 500,000 hectares to 8.3 million hectares, its lowest in 6 years. India's cotton production declined about 700,000 bales to 11.5 million.

Foreign Consumption, Trade, and Stocks

Foreign consumption in 2000/01 is forecast at 82.4 million bales, up 1 percent from the previous year for back-to-back records in foreign use. The strong (9 percent) consumption increase in 1999/2000 was fueled by low prices and a red-hot world economy, but also increased inventories of yarn and textiles. These inventories, coupled with rising cotton prices and slower economic growth in 2001, helped moderate consumption growth in 2000/01. Consumption in China is forecast at 23 million bales and is also a record. However, total consumption in all other foreign countries is forecast virtually unchanged from 1999/2000.

Consumption within the other foreign countries shows great variability. Brazil and Argentina have shown strong growth in consumption due both to improving economic conditions and large local crops. Consumption in the NIS grew by 10 percent helped by economic growth in Russia and other former Soviet Republics. Pakistan and Bangladesh are also forecast to increase consumption in 2000/01.

In contrast, consumption declines in Turkey and Mexico are expected in 2000/01 following large increases in 1999/2000. Continued declining consumption is forecast in higher income Asian countries; Korea is forecast down 9 percent, Japan down 10 percent, and Taiwan down 12 percent. Also, consumption in India has suffered from a slowing world economy and increased textile export competition.

China, the world's largest producer and spinner of cotton has pursued a policy of price liberalization, coupled with aggressive stocks disposal since August 1999. Procurement prices fell sharply for the 1999 crop, and production responded accordingly, dropping 15 percent or about 4 million bales, from the preceding year. Concurrent with reduced production, consumption benefited both from lower cotton prices, which competed favorably with higher synthetic prices, and from a recovery in world textile demand—China's cotton consumption rose nearly 16 percent in 1999/2000. The government of China also subsidized exports and limited imports last marketing year, with the result that ending stocks fell a staggering 6 million bales to about 15 million.

China's stocks are projected to be reduced further in 2000/01, the second year of the reform program, but the magnitude of the reduction will be more constrained. The latest official government estimates suggest that 2000-crop production has recovered, rising about 14 percent from 1999, due to higher cotton prices in combination with lower grain prices in the spring of 2000. Consumption is forecast to continue to outstrip production, but the consumption increase is projected at a more modest 3.6 percent, reflecting slower growth in demand for Chinese

textile exports. Continued restrictions on imports are likely to hold the season total to about 500,000 bales; this policy has the advantage of allowing the government to sell its accumulated surpluses for domestic use and the disadvantage of raising China's internal prices well above world market-clearing levels. Higher internal prices and the elimination of export subsidies have hurt China's export prospects and shipments are projected at only 700,000 bales, down 1 million from 1999/2000.

While world ending stocks for 2000/01 are projected down 3.7 million bales to 37.3 million, the lowest level in 5 years, foreign stocks are forecast down 4.3 million bales to 32.8 million, the lowest in 6 years, with most of the decrease is occurring in China. China's ending stocks of 11.8 million bales are down over 20 percent from the previous year. India and Pakistan also saw stocks fall as lower domestic production tightened those markets. Decreased production in the producing former Soviet Republics also tightened stocks in those export-driven markets. However, some increases in ending stocks are also seen, primarily in producing countries that had large production gains--Brazil, Paraguay, and Syria.

2001/02 World Cotton Outlook

The preliminary outlook for the world in 2001/02 suggests higher area, production, and consumption, with world ending stocks near the beginning level. World price performance of cotton has been relatively favorable—average world prices (U.S. Gulf ports) for wheat, corn, and soybeans during the 3 months ending January 2001 have surpassed year-earlier levels by 24, 8, and 6 percent, respectively. The comparable gain for cotton's A-Index was 41 percent. Global production is projected at 93 million bales. Although world consumption could be limited by the slower rates of world economic growth forecast for 2001 and 2002, world mill use is projected to equal production at 93 million bales. World trade is expected to rise primarily in response to the higher projected import demand by China.

2001/02 Foreign Cotton Outlook

Foreign Area, Yield, and Production

After falling for 2 years, foreign cotton area seems likely to rebound in 2001/02, rising more than 1 million hectares, and returning to the 28-million-hectare level it achieved on average during the 1990's. Gains in China, India, Uzbekistan, the Franc Zone, and Brazil are expected to contribute to the increase. With higher area in most major foreign producing countries likely, foreign production could rise 3 million bales to about 74 million in 2001/02. At this level, foreign production would be its largest since 1995/96.

China's cotton prices have continued to drift upward during the 2000/01 marketing year to date, with widespread reports of private dealers procuring cotton outside of the Supply and Marketing Cooperatives system at prices well above last year. Grain prices have improved as well, but official policy is still to discourage low quality grain production, and winter wheat area this year fell by 10 percent, based on various reports. During 2000/01, the opportunity to use Bt cotton reportedly contributed to large cotton area increases in eastern China, and further gains are expected in provinces that saw their cotton area plummet during the early 1990's due to bollworm infestations. In western China, authorities in Xinjiang are reportedly not pursuing efforts to reduce cotton area. Press reports from China have indicated that farmers are indeed planning to increase cotton area at the expense of grain in the east, and an increase in total national area seems likely. While it is difficult to forecast yet another year of record yields, the increased use of Bt cotton suggests that yields will remain near recent records. China's cotton production would therefore be expected to increase in 2001/02 compared with 2000/01's 20 million bales.

In India, cotton prices have risen during 2000/01 for the first time in 3 years, and grain prices have been weakening. Price alone should bring more area into cotton during 2001/02, and more normal weather could further increase area in Gujarat, where a late monsoon reduced plantings last season. Normal weather would also assure that while yields might fall compared with 2000/01, they should at least approximate a 3-year average and production could rise as much as 1 million bales.

Pakistan's area is likely to rise in part due to expected continued short irrigation supplies, as farmers may shift some area from rice to cotton to reduce water use. Several years of below normal precipitation affected

production in 2000/01, and the shortfall has not been made up in the last year. Pakistan's cotton yields have been unusually high during the last 2 years, in part reflecting unusually dry weather at the end of the season, and possibly some shifts to new varieties. Little change is likely for Pakistan's production in 2001/02 as a return to more normal yields and rising area proves about offsetting.

Difficulties with irrigation supplies are also expected to continue to affect Uzbekistan's production, but higher yields than 2000/01 are likely there in the coming year assuming a return to normal late-season weather. Uzbekistan's government has reported plans for a slight increase in total area, up 15,000 hectares to 1.435 million, and with improved yields, production there could increase several 100,000 bales.

A similar increase seems in order for producers in West Africa's Franc Zone. Production there fell steeply in 2000/01 due to a combination of poor weather and the cumulative effect of several years of falling prices. The system of input procurement and cotton marketing through parastatal corporations serves to delay some of the impact of world cotton price changes on production in the region; on the other hand, the late planting dates for these equatorial countries may provide a sufficient lag for this season's price gains to lead to increased area in 2001/02.

In the Southern Hemisphere, Brazil's Mato Grosso is likely to continue to expand, increasing both Brazil's area and national average yield, and bringing production up towards the 4 million-bale-level last seen in the mid-1980's. Higher area is likely in Argentina, assuming weather permits intended plantings to occur, and Australia is likely to continue its long-standing trend of increasing its cotton area given sufficient irrigation supplies.

The improvement in cotton prices that began in November 1999 (albeit, with occasional setbacks) is expected to increase efforts to produce cotton across a variety of smaller countries as well. It is difficult to forecast any significant declines to offset the increases expected in China, India, the Franc Zone, and the Southern Hemisphere. Industry reports from Turkey suggest lower area is possible there in 2001/02 following that country's economic crisis and proposed lower government payments, but it remains to be seen if Turkey will in fact reduce its production for the third consecutive year.

Foreign Consumption, Trade, and Stocks

With projected world GDP growth in 2001 and 2002 of 3.1 and 3.6 percent, respectively, world mill use in 2001/02 is projected to be the third consecutive record, something that has not happened since the late 1980's, before the breakup of the Soviet Union and the Asian crises. Also supporting the rise in consumption is the current relationship of cotton prices to those of manmade fibers. Total foreign use is also projected to increase to a record of 83.5 million bales, an increase of over 1 million bales from 2000/01.

Consumption in China is expected to account for half of the gain in foreign consumption, with an increase of more than 2 percent to about 23.5 million bales, based on strong GDP growth, larger textile exports and increased domestic demand. Russia's consumption growth is also likely to maintain its momentum during 2001/02, as higher oil prices have improved export earnings and the late-1998 exchange rate shock continues to improve the net trade position of several industries, including textiles. More restrained growth is anticipated for Brazil, India, Mexico, Indonesia, Pakistan and Turkey. Partially offsetting these increases are modest declines forecast for the developed Asian cotton-importing countries, such as Japan, Korea, and Taiwan. High labor costs and strong competition from China are likely to continue to erode cotton spinning in these countries.

Turning to foreign trade, import demand is likely to rise in 2001/02 compared with 2000/01, largely because of China. At 28 to 29 million bales, foreign imports are expected to rebound to their 1996/97 level, about 1.5 million bales above 2000/01 imports. Imports are expected to account for a higher share of world consumption in 2001/02, about 31 percent compared with about 29 percent in 2000/01. Global textile capacity has been shifting away from steady importers like Russia and Japan to cotton producing countries like India, China, and Brazil. Thus, the imported share of world cotton consumption has tended to decline, averaging 34 percent in the first half of the 1990's, and 31 percent during the second half. In 2001/02, the continued recovery in Russia's textile industries and a shortage of higher quality cotton in China mean the next marketing year could deviate from that longer term trend.

Projections for China's supply and demand, and especially for China's net trade, are key variables affecting the world and U.S. outlook for 2001/02; yet, these projections are highly uncertain. In addition to the usual volatility of weather, demand, and other economic factors, China is likely to join the WTO sometime during the 2001/02 marketing year. The terms of accession include the opening of a tariff rate quota (TRQ) of about 4.1 million bales of raw cotton in calendar 2001, of which two-thirds is reserved for non-State trading enterprises. Such a large import quota, if implemented as envisioned in the WTO agreement, could materially change the outlook. However, because of the many uncertainties affecting both the timing of the accession and the establishment and allocation of the TRQ, USDA will follow its customary procedure of basing its official estimates on existing policy and will not incorporate WTO effects until such time as China formally accedes.

Projections for China in 2001/02 indicate a further shortfall of production relative to consumption of 2-3 million bales. Even without the requirements imposed by WTO membership, it will become increasingly difficult to fill this gap entirely from old-crop stocks, due to quality and circulation issues. The government of China has auctioned more than 8.5 million bales of stocks since the reforms were first implemented in September 1999, and the evidence suggests that the better quality stocks were sold first. As the surplus stocks are reduced, it is likely to be increasingly difficult to meet mill demand for higher qualities. In addition, China continues to struggle with problems in the circulation system, including logistical, legal and financial problems, which impede the movement of cotton from the far-Western Xinjiang region to the mills in the east. To some extent, the government's auction program has addressed these circulation difficulties by moving old-crop cotton into position for sale and then serving as a relatively reliable supplier. As China's mills become more dependent on current-crop production, the old circulation problems are likely to resurface and the mills may respond by demanding access to foreign supplies.

For these reasons, the government will come under increased pressure to expand existing quotas, especially if WTO accession is delayed. Imports of 2 million bales are projected for 2001/02; at the same time exports are projected to decline slightly to about 500,000 bales. The net effect would be to reduce China's stocks to 10.8 million bales, or about 46 percent of total use.

Imports by foreign countries outside China are likely to follow consumption trends and the patterns established in 2000/01. India's imports of high-quality cotton by export-oriented mills have become an integral part of her supply and demand balance. With little or no increase in production and a recovery in textile activity, Turkey's imports are likely to rise. For the rest of the world, little net change is likely as possible gains in South and Southeast Asia are offset by possible continued declines in East Asia and the European Union. Lower imports are likely once more for Brazil, which has seen imports fall by 1.2 million bales during 1996-2000 as production rebounded.

With regard to the major foreign exporting countries, higher exports are likely from Central Asia and the African Franc Zone. In Central Asia, however, export supplies will be partially constrained by growth in the domestic textile industries, which have been supported by government transfers of resources from agriculture to industry through farm pricing policies and exchange rate policies. Reports of further investment in textile capacity in Central Asia have occurred regularly over the last year and further increases in consumption are expected in 2001. And, in both Central Asia and the African Franc Zone, export growth will be somewhat constrained by the need to rebuild stocks. At the same time, relatively tight supplies are expected to reduce exports from China, Egypt, and Pakistan.

With world production in 2001/02 expected to reach the level of consumption for the first time in 4 years, world ending stocks are forecast unchanged at 37.3 million bales, remaining at their lowest level since 1995/96. A projected increase in U.S. stocks is forecast to nearly offset a reduction of 1.0 million bales in China's stocks, implying only marginal gains in other foreign countries' stocks in 2001/02.

2001/02 U.S. Cotton Outlook

U.S. Area, Yield, and Production

Planted acreage in 2001 will be influenced by many factors including planting flexibility, price prospects for alternative crops, weather during planting, the cotton marketing loan program, and the numerous insurance options available to producers. Price ratios based on harvest time futures for corn vs. cotton and soybeans vs.

cotton indicate that relative prices have changed little compared with this time last year. As a result, analysis based solely on expected market returns would suggest that cotton area should be similar to last season. Consequently, other non-price factors will help determine area in 2001.

Anecdotal information suggests that cotton acreage will equal or exceed last year's area in each region of the Cotton Belt. The marketing loan program continues to provide a safety net for cotton producers and recent changes in the crop insurance program have improved cotton's financial viability. The Agricultural Risk Protection Act of 2000 (ARPA) provides additional subsidies to reduce producer premiums, especially for the higher level "buy-up" insurance coverage. In some Southeastern and Delta counties, the producer's premium for 75-percent cotton insurance coverage will drop by 20 percent or more for the 2001 crop. In overall terms, the gain for cotton is greater than for the lower-cost, lower-risk grains and soybeans because the total cotton premium is higher and the subsidy is a flat percentage.

But of course, the question remains of what level of area to expect. The acreage survey recently published by the National Cotton Council suggests that cotton producers will increase acreage in 2001 by 2 percent. USDA is currently projecting 2001 cotton planted area at 16 million acres, 3 percent above 2000 plantings and the highest since 16.9 million acres were planted in 1995. The projection includes about 250,000 acres for ELS cotton, with the remaining area devoted to upland. The extent of cotton area increases will likely vary by region but will be based on expected net returns and producers' assessment of relative risk. While USDA is not forecasting regional cotton area at this time, a look at upland cotton area over the past decade shows some general trends in each region. Area that once moved westward returned to the Southeast and Delta regions. Additionally, the lack of viable alternatives in the Southwest and West regions during the past year or two has seen these regions rise once again.

While total cotton planted area is expected to rise in 2001, a return to a lower, more normal abandonment should keep harvested acreage well above that of the 2000/01 season. If the abandonment rate is near 9 percent during the upcoming season, harvested area based on the scenario presented here would total about 14.6 million acres, 11 percent above 2000/01. Yields, however, are projected to decline slightly in 2001 due to projected higher input costs—specifically fertilizer, fuel, and water—and the expected increase in marginal acres planted to cotton. The preliminary yield projection for 2001/02 is 625 pounds per harvested acre, which is about 20 pounds below the 10-year average but equal to the average over the last 10 years when area has exceeded 14 million acres.

Based on these acreage and yield assumptions, U.S. cotton production in 2001 would total 19 million bales, approximately 10 percent above the 2000 crop. Coupled with the current beginning stock estimate of 4.5 million bales, total U.S. cotton supplies next season would reach 23.5 million bales, 2.3 million above 2000/01 and the highest U.S. cotton supply in 35 years.

U.S. Mill Use and Exports

U.S. cotton exports in 2001/02 are expected to continue to expand from the similar shipment levels recorded during the previous 2 seasons. The early projection for U.S. cotton exports during the upcoming season is 8.7 million bales, 24 percent above the 2000/01 estimate and the largest cotton shipments in 7 years. With the export forecast well above the 5-year average of 6.5 million bales, the forecast shipment level would represent a vast improvement in the U.S. share of world cotton trade from 26 percent in 2000/01 to more than 30 percent in 2001/02.

Exports will likely be boosted by plentiful U.S. supplies provided by increased production, by an anticipated decline in foreign stocks during 2000/01, and by increased foreign import demand in 2001/02, particularly from China. In addition, China's accession to the WTO in 2001/02 could expand U.S. export prospects further as the opening of additional import quotas would bode well for the United States, a historically large raw cotton supplier to China. As a result, U.S. cotton should be in a more favorable situation in 2001/02 to help supply the anticipated rise in world consumption. The United States will begin the 2001/02 season with 4.5 million bales of carryover, the highest since 1993/94, while several U.S. competitors' supplies will have declined.

Unlike exports, U.S. cotton mill consumption is projected to decrease from 2000/01, although the rate of decline may be smaller than that of the previous season. The preliminary estimate places U.S. mill use at 9.5 million

bales, about 2 percent below the 2000/01 estimate. Along with a slower expected growth in U.S. GDP in 2001 and 2002, the continued gains in U.S. cotton textile and apparel imports is likely to result in lower mill use. In calendar 2000, cotton textile imports rose for the 12th consecutive year and could reach another record in 2001. Although U.S. retail cotton consumption could expand next season, the growth likely will be satisfied by imports.

Cotton textile trade will play an important role in shaping U.S. cotton demand in 2001 and beyond. Trade agreements, like NAFTA and CBI, have changed the landscape of U.S. textile trade and have forced structural changes in the U.S. textile and apparel sectors over the last several years. Since NAFTA's inception in 1994, more semi-processed products are exported to other North American countries, particularly Mexico, before returning to the United States as finished products. In 1993, for example, the United States exported the equivalent of just under 1 billion pounds of raw cotton in the form of textiles and apparel. At that time, NAFTA and CBI countries were the destination for 34 and 31 percent of the total, respectively, while Asian countries accounted for 14 percent. In 2000, U.S. cotton textile exports have climbed to a record 2.4 billion pounds; while the volume has changed dramatically, so have the shares. NAFTA now accounts for 53 percent of the U.S. cotton textile export market, compared with 35 percent for CBI, and 3 percent for Asia.

Likewise, a similar trend can be seen in U.S. cotton textile imports. In 1993, the United States imported the equivalent of 3.6 billion pounds of raw cotton in the form of textiles and apparel. NAFTA and CBI countries were the source for 6 and 12 percent of the total, respectively, while Asian countries contributed 65 percent. However, the changes in the U.S. textile industry that have promoted outward processing have also provided a dramatic shift in shares along with rising imports. In 2000, U.S. cotton textile imports achieved a record 7.6 billion pounds. While the volume of imports from Asian countries has risen, the share has fallen to 46 percent. In comparison, both volume and share have increased for NAFTA and CBI countries, accounting for 23 and 18 percent respectively.

As a result, the combined mill use and export projections are seen higher in 2001/02, with total demand for U.S. cotton projected to expand 9 percent to 18.2 million bales, the highest level since the 1997/98 marketing year. And, while U.S. production has been affected dramatically by weather during the last 2 seasons, this level of demand should be easily satisfied with only average acreage and yield in 2001/02. These two factors, of course, will play a major role in determining available supplies next season.

U.S. Supply, Stocks, and Farm Income

Although a return to more normal yields after two years of adverse weather would raise market income, the elimination of supplemental AMTA payments of about \$600 million is likely to reduce farmers' overall returns. Preliminary estimates place gross farm income at \$6.45 billion, down about 2.5 percent from 2000, and net returns over variable costs at about \$115 per acre, compared with \$142 estimated for the 2000 crop.

Based on the supply and demand scenario presented here, 2001/02 U.S. cotton supplies are forecast to reach 23.5 million bales, the largest since 1966/67. And, with 2001 U.S. cotton production projected in excess of the expanding demand, U.S. carryover stocks in 2001/02 would rise nearly 18 percent to 5.3 million bales, the largest ending stock level since 1988/89. This implies a relatively large stocks-to-use ratio of 29 percent, which reflects ample U.S. stocks to bridge the gap until new-crop cotton becomes available in the fall.

Summary

In summary, cotton will continue to compete with alternative crops for area here in the United States and abroad. Supply and demand changes, and the price response that these changes provide, will indicate the acreage planted in a given year. And once the fiber is produced, cotton will be competing with other fibers, like polyester, at domestic mills and on the world market in the form of raw fiber or cotton textile and apparel products. Growth in world demand will be the key to the continued success of U.S. cotton, with textile and apparel trade playing a significant role.

We would like to reiterate that the projections presented here are based on information and data as of February 2001. These projections will inevitably change as more information becomes available. The National Cotton Council recently provided a benchmark of farmers' intentions as of early January and NASS will provide the results

of its upcoming *Prospective Plantings* survey at the end of March. While the Farm Act allows producers flexibility in determining cotton area, weather during the growing season will once again be a major influence on yield and ultimately how much cotton is actually produced.

REFCO GLOBAL RESEARCH PERSPECTIVE ON USDA OUTLOOK FORUM
FORECASTS FOR '01/02 U.S. CORN & WHEAT SUPPLY/DEMAND

Richard J. Feltes
V.P. & Director of Refco Research

Highlights of Mr. Feltes' remarks by subject matter are as follows:

General Overview: The backdrop for grain/oilseed price discovery in '01/02 is framed by slowing global GDP growth, delayed PRC WTO entry, large US free stocks of grain, above trend '01 South American row crop yields and a substantially improved winter moisture flow (vs. last year) over the central US. Some markets are beginning to discount likelihood of trend or higher '01 US yields as evidenced by modest fund shorts in wheat and soybeans. Thus stage is set for a bullish surprise if summer weather adversity strikes just as bulls were vulnerable last year to LH May rains which reduced drought fears. Spec capital will amass quickly (particularly with dot.bomb on Wall Street) if US food supply is threatened. Furthermore, we suspect that end users have far less forward coverage on today than last year. Nonetheless, there are ample old crop supplies of grain & oilseeds thus choppy/lower trade is probable until/unless crop adversity strikes this summer. CZ & SX calendar year highs were posted by March every year since 1996 except 2000 when May highs reflected concern over drought.

2001 Weather & Crop Outlook: Dry autumn 2000 US palmer index ratings in the Delta and Missouri Valley have improved while moisture ratings across most of the HRW belt have been upgraded to "above normal". Western IA, southeast NB and northeast KS are the only prime Midwest growing areas in need of additional pre plant soil moisture recharge. The two major underpinnings of the spring 2000 bull market in grains, drought fears and steadily increasing estimates of US CN/BN demand, are noticeable absent in 2001. Southern Oscillation forecasters, who based on a fading La Nina correctly forecasted a more harsh 00/01 US winter with the coldest temps frontloaded in Nov/Dec, are indicating likelihood of a cooler and wetter than normal Spring/Summer in the US. This pattern, if realized, fits with our data on US planting dates which suggest low odds of posting 3 successive years of early US corn planting. Summer US Midwest rainfall was below average in 5 of last 6 years suggesting that the US is overdue for a wetter than normal growing season. The corn market may initially react positively to a wet spring induced loss of additional corn acres. But years with wet springs and low final corn yields are rare. Bottom line--the US Great Plains and Midwest are poised with much better moisture reserves than last year but are not so wet, as yet, as to suggest prolonged planting delays. The grain markets will assume trend or higher '01 US yields until/unless weather events suggest otherwise.

USDA Track Record: February Outlook Forecasts vs. Final:

Corn-- USDA has underestimated final new crop corn stocks at the Feb Outlook Forum in 4 of the last 6 years including the 177 mil bu underestimation of 9/01 US corn stocks at the Feb 2000 Outlook Conference. USDA overestimated final corn demand at the Feb Outlook Forum all years from '95-'98 by 380-550 mil bu although '01/02 US corn demand is currently 245 mil bu more than USDA forecasted at the February 2000 Outlook Forum. Final US corn yields have exceeded USDA's February Outlook Forum yield forecasts in each of the last 3 years.

Soybeans—USDA has overestimated final new crop soybean stocks at the February Outlook Forum in each of the last 6 years including the 220 mil bu overestimation of 9/01 US soybean stocks at the February 2000 Outlook Forum. USDA overestimated final US soybean yield at the February Outlook Forum in 4 of the last 6 years including the 1.9 BPA overestimation of the final 2000 yield. Contrary to trade perceptions, USDA has overestimated final US soybean demand in each of the last 3 years at the February Outlook conference. Most of the error in overestimating final soybean stocks at USDA's February Outlook Forum is due to overestimation of production.

Wheat—USDA has underestimated final new crop wheat stocks at the February Outlook Forum in 5 of the last 6 years including the 53 mil bu underestimation of 6/01 US wheat stocks at the February 2000 Outlook Forum. USDA February Outlook Forum estimates of US wheat demand are typically quite accurate but their February Outlook forecasts of US wheat yield have fallen well short of final US wheat yields in each of the last 4 years. Chicago May wheat has consistently traded lower following release of USDA's February Outlook Forum forecasts of US wheat stocks with price erosion ranging from 3.5-12 cents/bushel on the 4th trading day following February release of the new crop wheat balance tables in 8 of the last 9 years.

Corn Outlook: December corn will be well supported in \$2.40-\$2.45 area through planting amid shrinking '01 US corn area and near 10 bil bu '00/01 US corn demand base. USDA's February Outlook Forum forecast for 9/01 US corn stocks of 1.636 bil bu is 120 mil bu below the range of private sector analysts including Refco, FCC, FABRI, Sparks and a respected private consultant. Thus post Outlook corn prices should be well supported—particularly in view of USDA reducing '01 US corn area only 1.6 mil acres vs. trade expectations for a 2.0-mil acre cut. Producers are advised to start hedging new crop corn at \$2.65 futures as odds of '01 crop adversity are less than last year while slowing growth in global GDP reduces odds of demand exceeding expectations. Funds will likely reinitiate modest fund long prior to March 30th acreage and stocks report but improved moisture base across US growing areas, large free stocks and slowing growth in '01/02 US corn demand base suggests that CZ highs could be in (as was the case every year since 1996) by May. Look for corn to gain on wheat during late winter/spring.

Wheat Outlook: Wheat lows are likely to be posted in June vs. September lows last year amid continued shrinkage in US and global wheat stocks in '01/02. Post harvest recovery will be limited, however, if 9/01 US corn stocks approach 1.7 bil bu. Note that 7/02 world wheat stocks, on paper, may dip below 100 mil tons to lowest absolute level since '76. But 7/02 wheat stocks held by major exporters—at trend '01/02 yields—will decline only nominally and still be 22 mmt above depressed levels in 95/96 that sparked record high wheat prices. WK has rallied during March in each of the last 4 years but has stalled out repeatedly between the \$2.85-\$3.00 level on weekly chart since June of 1998. Post harvest price strength will also be contained by slow growth in world wheat offtake driven in part by ample supplies of competitively priced feed grains. Wheat stocks held by China are a major unknown but what is known is that both public and private sector analysts have overestimated PRC wheat imports over the last 2 years. Advise buying KWN and selling WN. Also advise buying KWZ in mid June amid expectations for another 40-70 mil bu reduction in 6/02 US HRW stocks to lowest level since 97/98. Estimate WN harvest low of \$2.55 amid belief that US winter wheat crop will emerge from dormancy in better shape than trade expects. USDA's February Outlook forecast for 6/02 US wheat stocks of 721 mil bu is only 34 mil bu less than trade expectations (and the trade is well aware that final US wheat stocks typically exceed USDA's February Outlook forecast).

PRC: PRC refrain from offering additional corn for export after April 1 has precluded new lows in corn but the trade remains skeptical and nervous regarding their export policies prior to their likely late

summer WTO entry. Could the 30-mmt decline in autumn 2001 PRC wheat & coarse grain stocks to lowest level in 7 years be prompting renewed concern over domestic food security? Or is Beijing simply waiting for a spring/summer rally in world corn prices to reduce their export subsidy? We suspect the later as informed private trade estimates of PRC grain stocks exceed USDA's estimates. The corn market is prone to assume that PRC corn exports will be reduced significantly upon WTO entry. But skeptics fear that WTO mandated elimination of PRC corn export subsidies would be replaced by direct producer payments that allow corn exports to continue legally unabated. Northeast China corn production, which rarely posts two bad years in succession, will continue to produce corn in excess of local needs. Thus we suspect that the corn market will view forecasts of '01/02 US corn exports in excess USDA Feb Outlook Forum forecast of 2.1 bu. with skepticism. Meanwhile, heavy PRC soybean imports will continue. PRC '01/02 soybean import tonnage in excess of USDA's current 8.6 mmt forecast is not nearly enough to offset swelling new crop soybean supplies in the US and S. America.

Farm Policy Recommendations: There is strong support within the Agricultural Commercial and Futures sectors for lowering the soybean loan rate to stem the increase in US soybean area that is occurring despite low prices. Furthermore, recommend extending 9 month loans to 14 months to alleviate late summer/fall price pressure resulting from surge in cash selling driven by convergence of loan maturities and harvest pressure. Suggest that additional interest costs incurred by USDA for 14 month loans be offset by limiting LDP on all commodities to 9 months storage (40 cents/bu). This plan would increase loan entries, ease harvest price pressure, reduce LDP payouts and force marketplace to pay more to pry grain under loan from farmer hands. Note also that increasingly large LDP payouts have prompted producers to become even more indifferent to market signals and therefore less likely to employ pro active risk management strategies that enhance returns in low flat price markets with attractive carrying charges.

Richard J. Feltes is Vice President and Director of Commodity Research at Refco. Feltes also serves as Senior Grain/Oilseed Analyst. Feltes joined Refco in October of 1984 from Conti Commodity Services, to amplify and target research support from Refco's expanding and increasingly diversified futures and options business. Rich is well known for his fact filled PowerPoint presentations on the outlook for agricultural prices. Feltes has authored numerous special reports, pamphlets and videos on grain/oilseed price direction. Refco's success in attracting numerous multi national food companies to its distinguished client base is due in part to Rich's insightful analysis of long term trends in grain prices. Feltes is an eleven-year veteran of Continental Grain Company (1973-1984). He spent three years as a cash merchant, and the balance as Senior Crop Scout responsible for estimating North and South American crop production. Feltes is a 1970 agricultural graduate of the University of Illinois and a 1972 MBA graduate of Southern Illinois University. He is a former Chairman of the University of Illinois' advisory committee on international agriculture.

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OUTLOOK FOR LIVESTOCK AND POULTRY

Joel L. Greene
Agricultural Economist
World Agricultural Outlook Board, USDA

The year 2000 was a record year in many ways for the livestock and poultry sector. Producers enjoyed favorable corn and soybean meal prices that benefitted the bottom line. There was a turnaround in hog prices; record beef and broiler production; record exports and imports of beef; and record exports of pork and broilers. If there were one concern for the meat industry, it would have to be the stagnating price situation for broilers last year.

Also, domestic economic growth and prosperity built demand for meat; and consumers responded at the meat counter, and perhaps most importantly, they spent more of their dollars on food away from home. Demand for beef and pork was especially strong, even as prices steadily increased. Red meat and poultry consumption remained at a high of about 220 pounds per person, on a retail basis.

In 2001, the livestock and poultry sectors face a situation somewhat similar to 2000. Feed costs are expected to remain relatively low, although slightly higher than last year. And even though the U.S. economy has begun to slow in 2001, it is still projected to expand about 2 percent this year. Perhaps the greatest risk at this moment for the meat outlook in 2001 is the uncertainty of how consumers will react to skyrocketing energy costs. Disposable income growth is expected to be about the same as in 2000, but a greater share of consumer budgets will go towards rising energy bills, and this may temper spending on food away from home.

Global economic growth was a key factor that enabled the livestock and poultry industries to expand exports in 2000. Although lower growth is projected in 2001, growth in key export markets underpin export forecasts. A major uncertainty hovering over the global meat outlook is the developing Bovine Spongiform Encephalopathy (BSE) situation in Europe. Some countries have banned imports of European beef, which could open some market opportunities for the United States as countries search for other sources of beef. Consumer response outside of Europe appears to be limited at this time, but if BSE concerns cause consumers to switch to other meats instead of beef, both U.S. pork and poultry exports may benefit. Although the impact of BSE in Europe on U.S. trade estimates is currently assumed to be limited, it is something which will be closely watched.

Cattle Continues the Liquidation Phase

In 2000, cattle liquidation continued with few signs that producers intend to begin rebuilding herds. Cattle inventories on January 1, 2001 were 97.3 million head, about 1 percent below a year earlier. Cattle continued to be placed on feed at a record pace, with the highest reported January 1 cattle on feed numbers—14.2 million head—since 1973. There were few signs of replacement heifers being held back, as commercial heifer slaughter surpassed 12 million head, the highest since 1976. Although beef replacement heifers are up 1.5 percent, a new category reported by NASS—heifers expected to calf in

2001—suggests fewer heifers will calve than in 2000. Strong cattle prices last year encouraged cattle marketings, but dry weather was the primary reason liquidation continued. Poor forage conditions throughout most of last year and a mediocre forage outlook heading into spring pulled cattle into feedlots all year. The severe winter weather in the Plains sent a surge of cattle into feedlots in the last quarter of 2000. These cattle, given more normal weather conditions, would have been on grass into the spring, placed in feedlots at mid-year, and then slaughtered in 2002. Heifer retention for breeding was limited. Heifers on feed in 2000 averaged over 40 percent of feedlot supplies for 7-State, 1,000 plus feedlots, the highest percentage reported in the nine years of the series data. Cattle inventories are expected to fall below 97 million head by the end of the year, and herd expansion is not expected to commence until 2003.

Cattle owners are keeping cattle on feed longer, taking advantage of relatively cheap grain prices, and feeding cattle to the Choice grade to capture the price premium. Last year, average dressed cattle weights were 9 pounds heavier than the previous year. The premium between Choice and Select grade beef took off at the end of 1999 and kept pace through 2000, surpassing \$15 per cwt in May before falling back. Demand for beef was firm, with strong export and hotel/restaurant sales providing additional support to Choice prices. During 2001, cattle will continue to be fed to higher weights in pursuit of the Choice grade, and weights could increase an additional 5 pounds to average 744 pounds. Given that cattle supplies outside feedlots on January 1, 2001 fell more than 3 percent, placements will tighten significantly during the year.

As a result of tighter cattle supplies and increased heifer retention, commercial beef production is forecast at 25.7 billion pounds in 2001, almost 4 percent lower than in 2000. For the first time since 1997, production fell below a year earlier in the fourth quarter of 2000. Production during the first half 2001 will fall around 2 percent, and accelerate to nearly a 6-percent decline in the second half of the year. Given the reduction in cattle supplies, beef production will be even tighter in 2002.

Even as beef production continued to rise during 2000, fed cattle prices strengthened to \$69.65 per cwt because of strong demand for beef. The “Millennium Effect” kicked in during the last quarter of 1999 and demand did not let up during 2000. Consumers continued to increase the amount of money spent on food away from home, which is generally supportive of meat demand. Consumers were also looking for quality as evidenced by the demand for Choice grade beef. By the third and fourth quarters of 2000 Choice retail prices averaged a record \$3.11 per pound, and \$3.07 for the year. Choice grade boxed beef averaged over \$117 per cwt, reached a spring seasonal peak of the upper \$120's per cwt, and closed out the year above \$130 per cwt.

In 2001, fed cattle prices are forecast to rise to \$72-77 per cwt. Tightening cattle supplies will provide the boost to prices, and demand for beef should remain intact. However, consumers may be somewhat more cautious in away from home spending as the economy cools relative to last year and consumer budgets are hit with high energy bills. However, domestic and export demand remains firm for Choice quality beef; this demand combined with tight supplies should keep retail prices record high, especially during the second half of the year.

Beef imports were a record 3 billion pounds in 2000. With U.S. cow slaughter declining over 3 percent in 2000 and prices for fresh 90's firming, Australia and New Zealand stepped up their exports of lean beef. Cow slaughter will decline further in 2001, but imports of beef are forecast to remain at about the same high level because of reduced supplies in Canada. Beef exports were 2.5 billion pounds in 2000 and are forecast to increase about 1 percent in 2001. Major growth markets are expected to be Mexico

and Korea. Korea's beef market was liberalized as of January 1, 2001, and although tariffs remain high, the market should function more freely without the Government of Korea imposing any quantity restrictions.

Hog Sector Expanding

Hog producers have responded to dramatically improved returns in 2000, and the hog industry has begun to move into an expansion phase after a significant price recovery last year. Hog inventories increased in 2000, and heading into 2001, the number of hogs on farms on December 1, 2000 was 59.8 million head, about 1 percent higher than a year earlier. Total sows farrowing in 2000 declined, but productivity has continued gaining. Since the crisis of late 1998 and early 1999, quarterly sows farrowing declined on a year over basis, until fourth quarter 2000. The December 28, 2000 *Hogs and Pigs* report showed September-November 2000 sows farrowing were 1 percent higher than a year earlier. Intentions for first quarter 2001 are 4 percent higher, but first intentions for second quarter only indicate a 1-percent gain.

Combined with continued productivity gains, the pig crop in 2001 is expected to be nearly 4 percent higher. Hog slaughter is projected to top 99 million head. After seven quarters of below-year-ago slaughter, hog slaughter in second quarter 2001 will exceed year earlier levels. The March-May intentions indicates that hog slaughter in fourth quarter 2001 will be about 26 million head. The March *Hogs and Pigs* report will better define fall slaughter. A 26-million-head slaughter would imply about a 2-million head slaughter a week. This is 1.6 million fewer head than slaughtered in fourth quarter 1998, and just 1 percent more than this past year.

Pork production in 2001 is forecast at nearly 19.3 billion pounds, almost 2 percent higher than in 2000. Production will begin to increase in the second quarter, accelerate in the third quarter, but grow more moderately in the fourth quarter. The greatest risk to the forecast is, of course, if hog producers significantly altered farrowing intentions for the second quarter of this year. Carcass weights gained 3 pounds in 2000. In 2001, the gain is projected to be more moderate at 1 pound, rising to an average of 194 pounds.

Hog prices rebounded in 2000 to average \$44.70 per cwt, over 30 percent higher than the previous year. In the second quarter of 2000, prices averaged over \$50 per cwt, the highest quarterly price since third quarter 1997. A lot of the strength came from bellies which surged to over \$100 per cwt in the spring as bacon was increasingly used in more restaurants, particularly fast food. In 2001, hog prices are forecast to decline to \$40-42 per cwt. As hog supplies build throughout the year, prices for hogs drop to the mid-\$30's per cwt in the fourth quarter, but for the rest of the year prices are expected to remain well above breakeven. If these hog prices hold, it will probably be sufficient to spur continued expansion.

Projected sows farrowing and pigs per litter for the second half of 2001, indicate large pig crops that will significantly boost pork production to record levels in 2002. Producer returns will likely drop to barely breakeven.

Pork exports continued to advance in 2000, reaching a record 1.3 billion pounds. In 2001, exports are forecast to increase about 2 percent. Exports to Japan and Canada increased an estimated 9 percent to each market, but growth was particularly strong to Mexico, up nearly 80 percent compared with 1999. These markets are expected to remain favorable for increased U.S. exports this year. Commercial exports to Russia began to pick up at the end of 2000 and there is a possibility that U.S. exports will continue to rise, especially if the demand for pork in Europe rises and limits its exports to competing

countries. Pork imports in 2000 increased about 17 percent to an estimated record 967 million pounds as pork flowed in from Canada, up 19 percent, and Denmark, up 11 percent. Pork imports in 2001 are forecast at 985 million pounds. Canadian pork production is not expected to expand as fast as previously expected, which may slow down the rate of U.S. import growth. However, live hog imports in 2001 should remain relatively high at over 4 million head, as hogs continue to be moved south instead of slaughtered in Canadian facilities.

Broiler Meat Production Growth to Slow

In 2000, federally inspected broiler production totaled 30.5 billion pounds, a 2.5-percent increase, and well below the average 5.5 percent growth of the 1990's. Broiler production is forecast at 31.1 billion pounds in 2001, an increase of less than 2 percent, the lowest rate of growth since the early 1980's. Production indicators point towards producers cutting back production growth in response to stagnant prices. NASS reported that the hatching egg flock on January 1, 2001 was about 1 percent lower than a year earlier. However, the productivity of the broiler hatching flock, in term of eggs per layer, continued to rise. In 2000, the average eggs per broiler layer increased about 1.5 percent, a slightly faster pace than the previous year. Cumulative potential placements into the hatchery supply flock shows that producers intend to pull back on production through the first half of the year. Also, weekly broiler eggs set and chicks placed data indicate declines from a year earlier from mid-October through January.

Weak returns over the last two years have pushed producers to cut back on production growth. Although returns to whole-bird producers were positive through 2000, parts prices have languished for the past two years. The whole bird trade accounts for a small share of business, so weak parts prices have hurt the industry's profitability.

Prices for boneless/skinless (b/s) breast meat were 13 percent lower in 2000 compared with the previous year, and compared with the average of the previous three years, 2000 b/s breast meat prices were a huge 20 percent lower. Leg quarter prices gained about 4 cents in 2000 compared with the previous year, but still greatly lag the pre-1999 level.

In 2001, the 12-City Wholesale broiler price is forecast to increase slightly to 55-59 cents per pound. The slowing in broiler production growth, coupled with tighter beef supplies, should halt the two-year slide in prices. Expectations are that b/s breast prices and leg quarters will pick up later in the year as production growth slows and exports pick up.

Broiler meat exports in 2000 increased 13 percent to a record 5.5 billion pounds. Exports showed a marked recovery in recent months as exports to Russia in 2000 almost doubled the previous year's level. Food aid shipments early in 2000 started the increase, and commercial exports to Russia began to take off in mid year. Low parts prices have made U.S. broiler meat an attractive buy for Mexico and China/Hong Kong, where exports were about 22 percent and 13 percent higher to each market. In 2001, broiler exports are forecast to increase about 3 percent to 5.7 billion pounds, another record year. Oil revenues for both Russia and Mexico should allow them to keep buying poultry, and with prices remaining attractive, China/Hong Kong will remain strong markets for U.S. broiler meat exports.

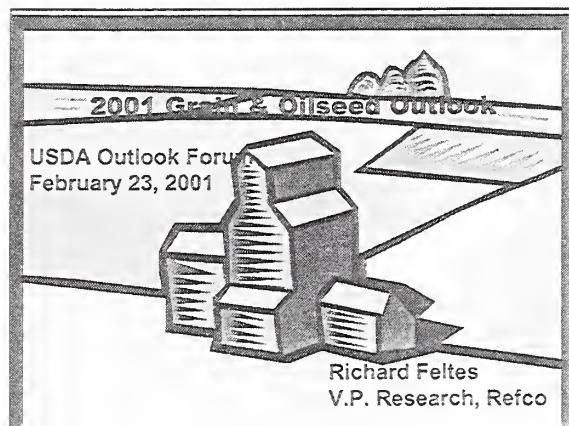
Turkey Production Increases

Continued positive returns to turkey producers in 2000 are expected to lead to another increase in turkey production in 2001. Turkey production in 2000 increased 2 percent to 5.4 billion pounds, and a nearly 4-percent increase is forecast for 2001, well above the growth rate of the last ten years. Turkey prices strengthened significantly in 1999, and then moved 2 percent higher in 2000. The expected rise in production will likely temper prices in 2001. Eastern Region Hen prices are forecast to average 66-70 cents per pound in 2001, about 2 cents below 2000.

Turkey exports recovered most of the ground lost in 1999, rising 21 percent to a projected 458 million pounds. Shipments to Mexico in 2000, the largest market for U.S. turkey exports, increased about 14 percent. There was also a substantial gain to Russia, where exports, while not yet recovering to pre-crisis levels, rebounded to about four times the 1999 level. Total turkey exports in 2001 are forecast to rise 3-4 percent, and will be driven primarily by shipments to Mexico. Any further increase in exports to Russia will likely be tempered by the policy change in 2000 that increased the turkey tariff and lowered the broiler tariff.

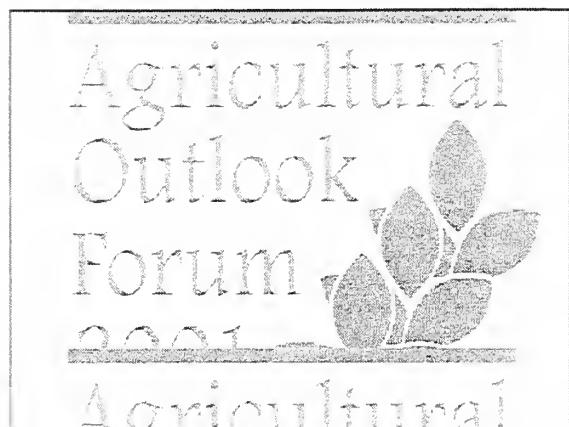
Egg Returns Favor Production Increases

Egg production in 2001 is forecast to rise again as returns to producers recovered after falling sharply in 1999. Table egg production increased 2 percent to 5.95 billion dozen in 2000, and hatching production was just fractionally higher at 1.08 billion dozen. Both table and hatching egg production are expected to increase slightly, putting total egg production at about 7.09 billion dozen. Hatching use dipped in 2000 but is expected to increase in 2001 as broiler production rises. Eggs broken are expected to increase in 2001 as consumption of eggs as ingredients in products continues to increase and the food service sector uses more pasturized egg products. Egg prices are forecast to further strengthen in 2001, rising back to the 1998 level of 73-78 cents per dozen.



Trading Rule

- The successful trader bases no moves on what supposedly will happen but reacts instead to what does happen.

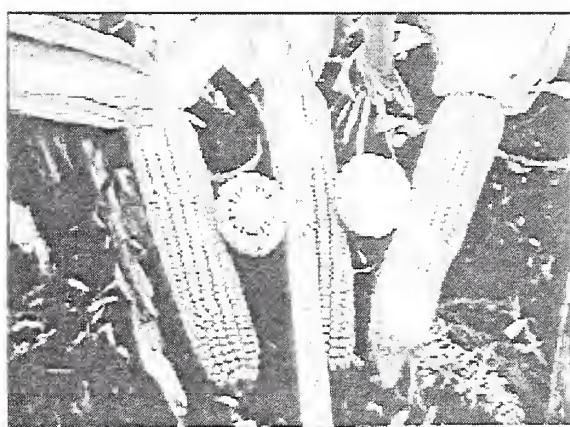


Trade vs. USDA Estimates of '01/02 Stocks

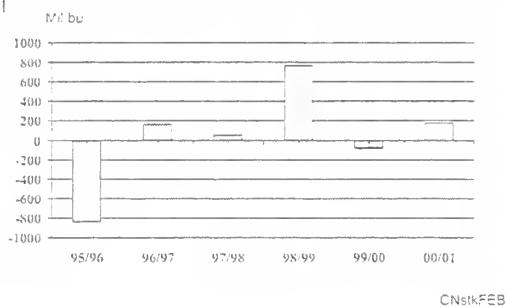
| | Refco | SCI | Fabri | FCC | Private | Avg. | USDA |
|-------|---------|------|-------|------|---------|------|------|
| | Consult | | | | | | |
| Corn | 1951 | 1492 | 1719 | 1631 | 2000 | 1759 | 1636 |
| Wheat | 755 | 812 | 757 | 672 | 770 | 753 | 721 |
| Beans | 567 | 655 | 393 | 489 | 570 | 535 | 475 |
| Oil | 2395 | 2406 | 2294 | 1985 | N/A | 2270 | 2420 |

Grains - mil bu. oil - mil lbs.

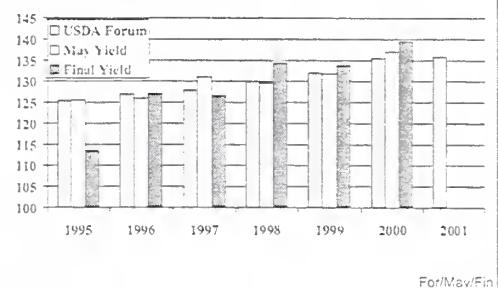
| USDA Outlook 2000 Est. of '00/01 Stocks vs. 2/01 Estimates & Forecasts for '01/02 | | | | | | |
|---|--------|-------|---------|--------------------|------------|--|
| USDA | USDA | Diff. | USDA | CZ, WN, SX, & BOZ | | |
| Outlook | 2/8/01 | | Outlook | '01 2/22 close vs. | | |
| 2000 | | | 2001 | '00 2/25 close | | |
| Corn | 1714 | 1891 | +177 | 1636 | +3 cents | |
| Wheat | 892 | 839 | -53 | 721 | +20 cents | |
| Beans | 510 | 345 | -167 | 475 | -51 cents | |
| Oil | 2345 | 2290 | -55 | 2420 | -.50 cents | |
| Grains - mil bu. Oil - mil lbs. | | | | | | |



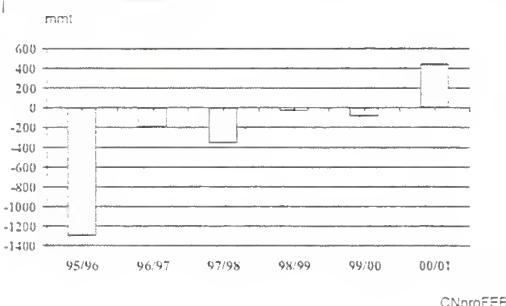
Final US Corn Stocks vs USDA Feb Outlook Forecast



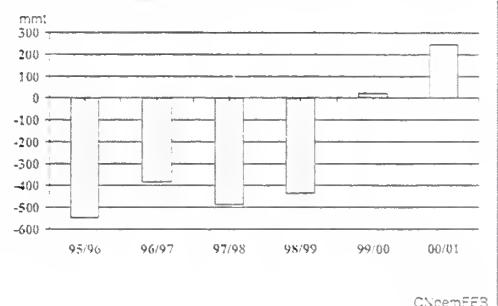
Feb Forum Est. vs. May Yield & Final Corn Yield



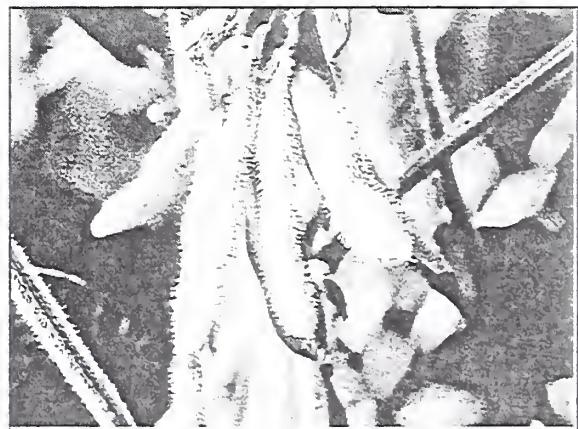
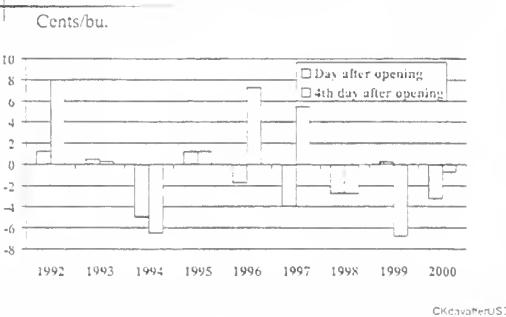
Final US Corn Production vs USDA Feb Outlook Forecast



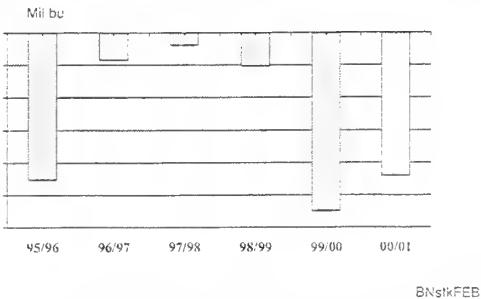
Final US Corn Demand vs USDA Feb Outlook Forecast



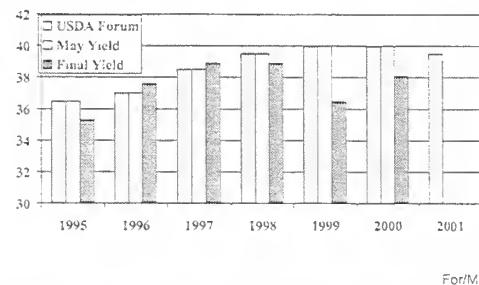
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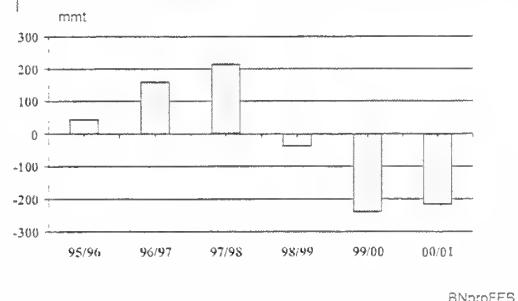
Final US Soybean Stocks vs USDA Feb Outlook Forecast



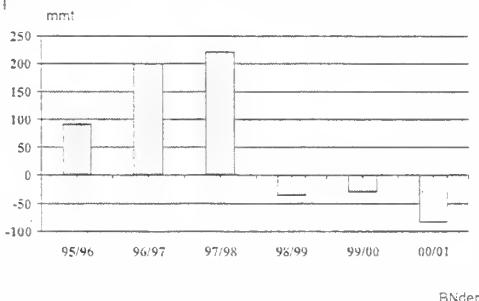
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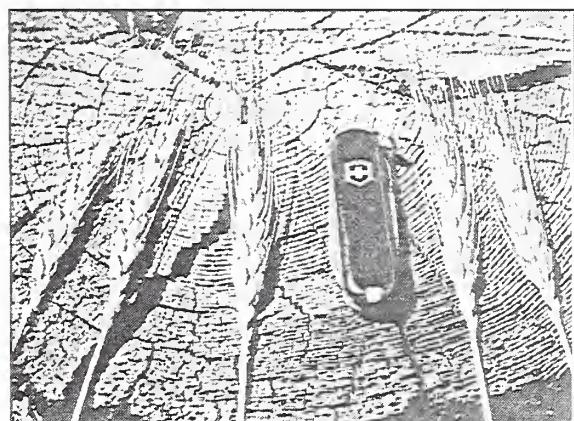
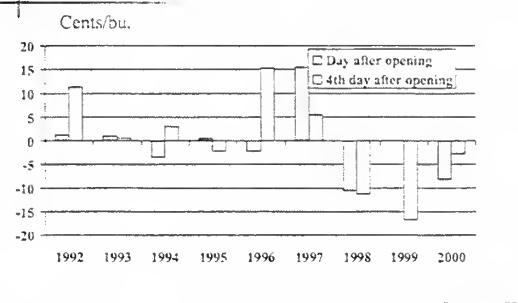
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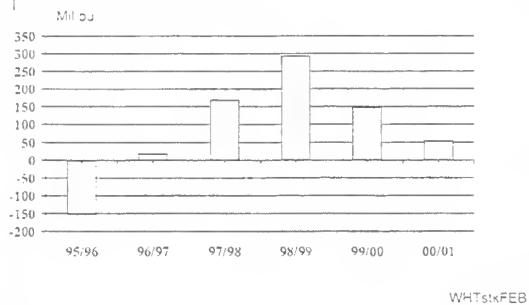
Final US Soybean Demand vs USDA Feb Outlook Forecast



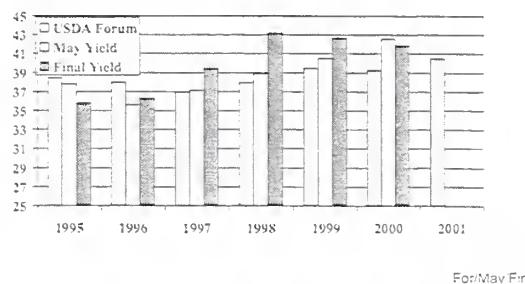
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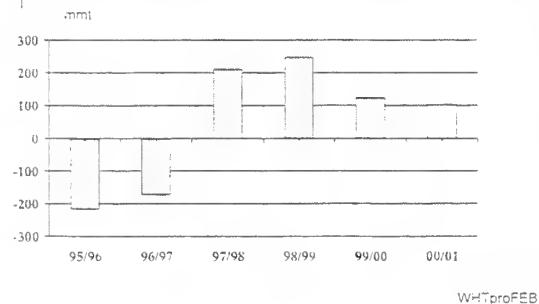
Final US Wheat Stocks vs USDA Feb Outlook Forecast



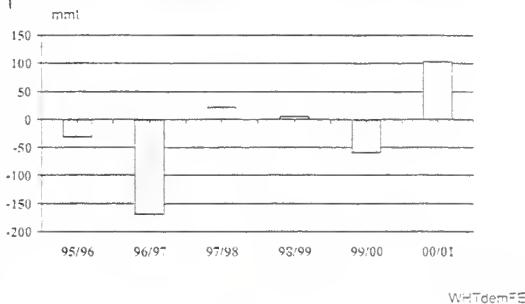
Feb Forum Est. vs. May Yield & Final Wheat Yield



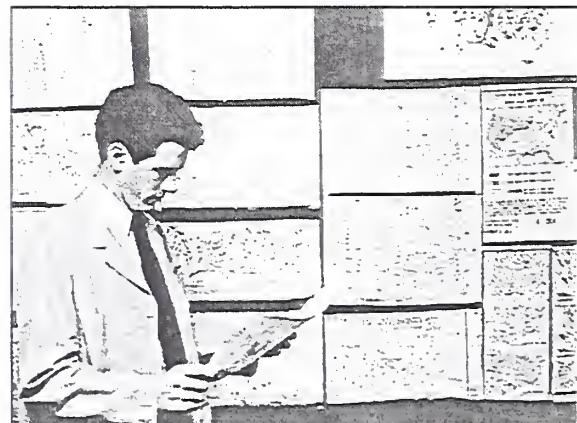
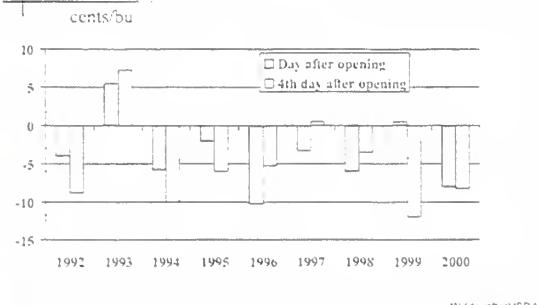
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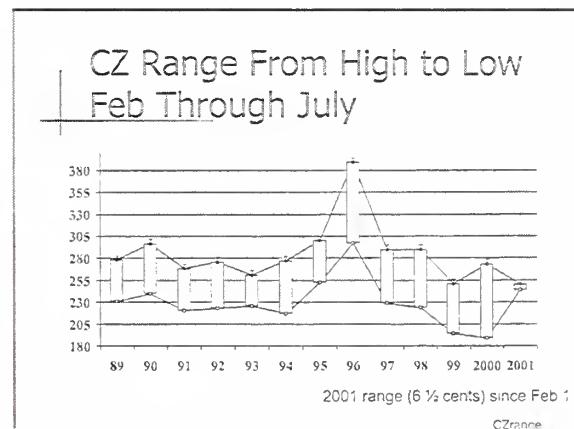
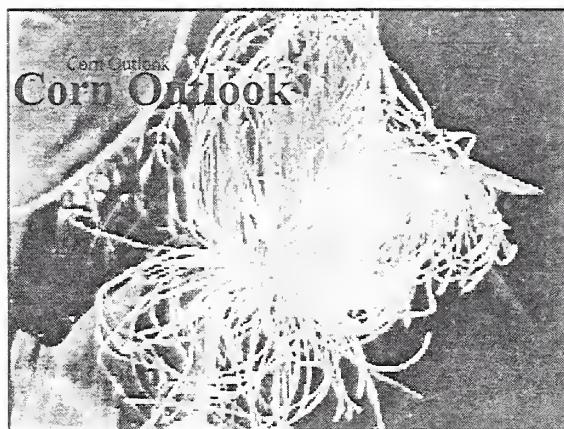
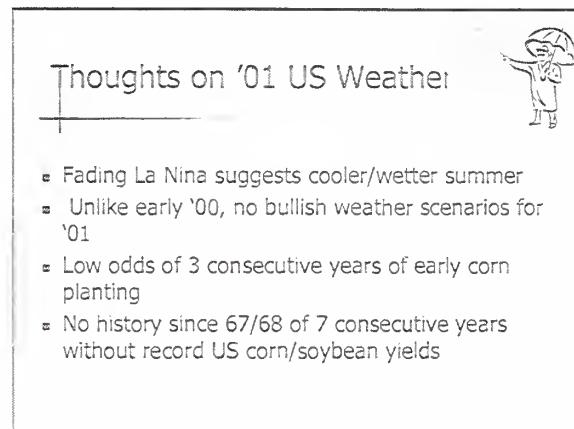
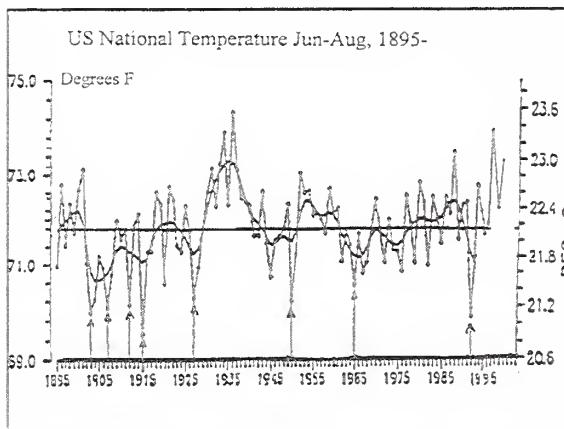
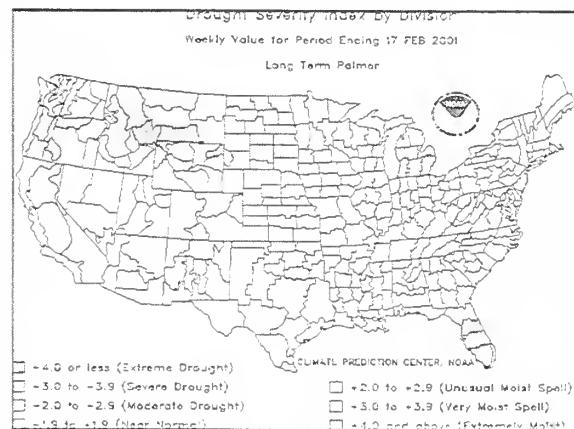
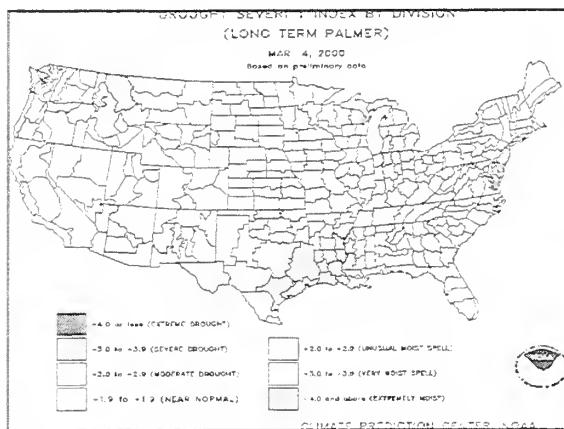


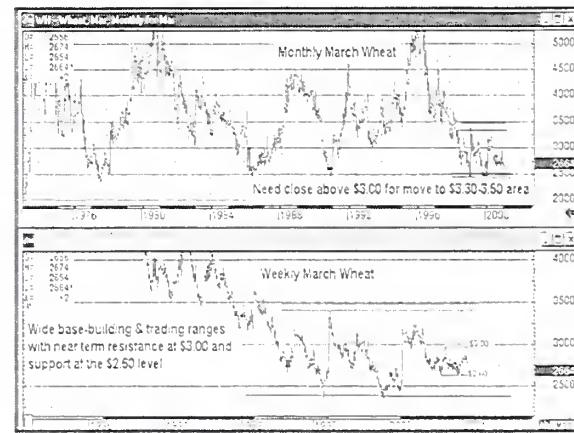
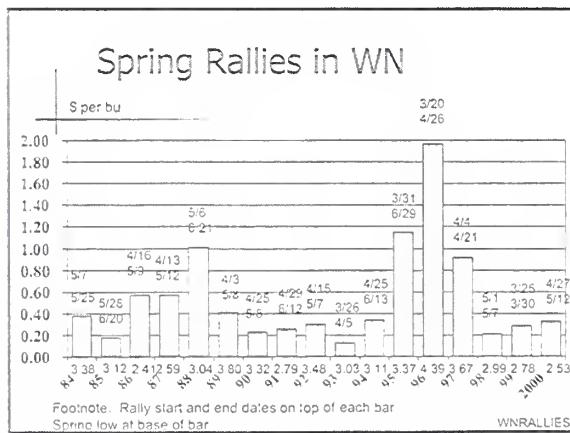
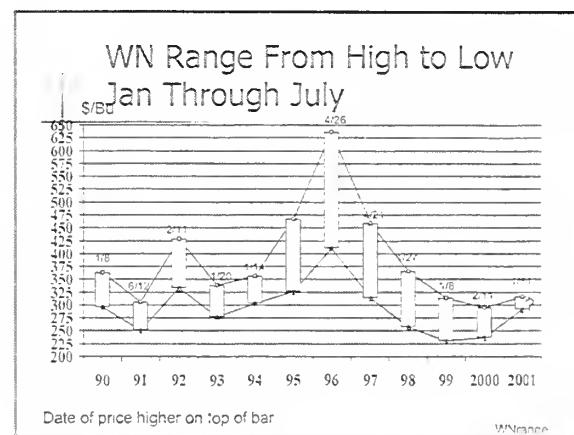
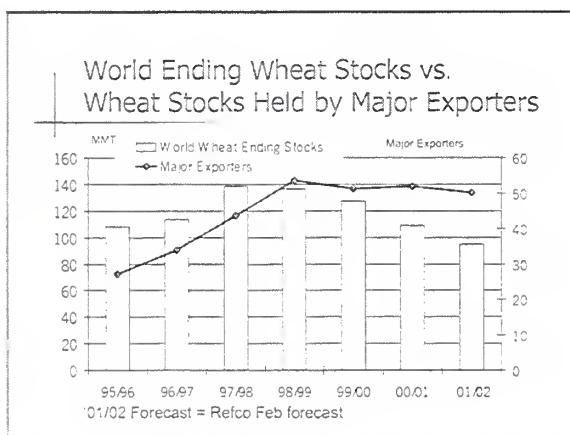
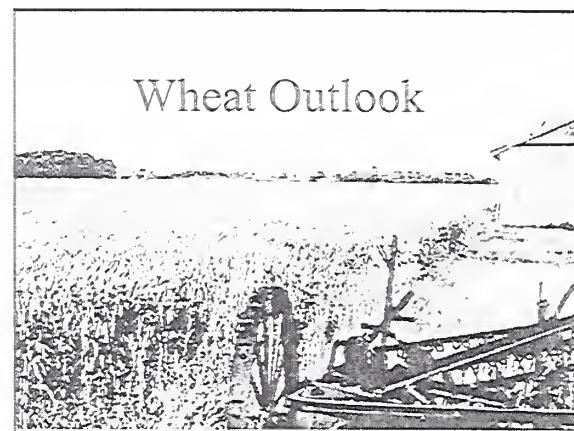
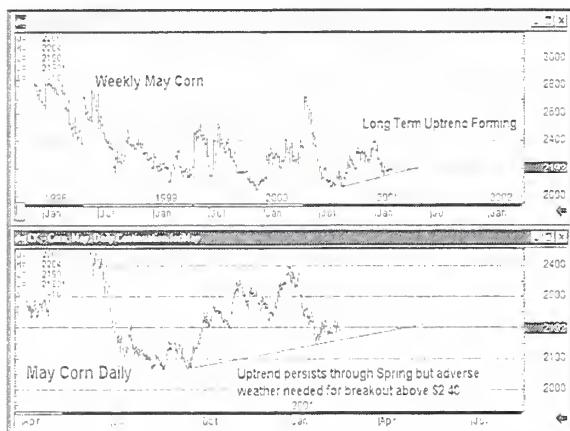
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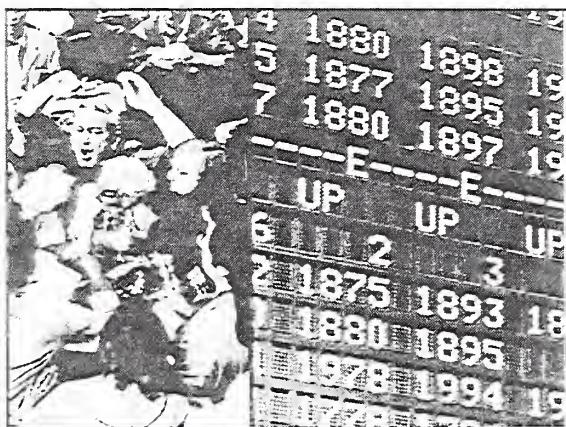


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- KWN support \$2.80-3.00; start hedging @ \$3.40 KWN
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- Wheat lows likely June vs. Sept in '00
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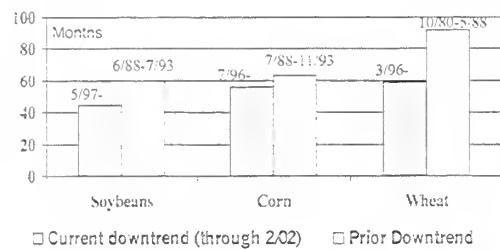


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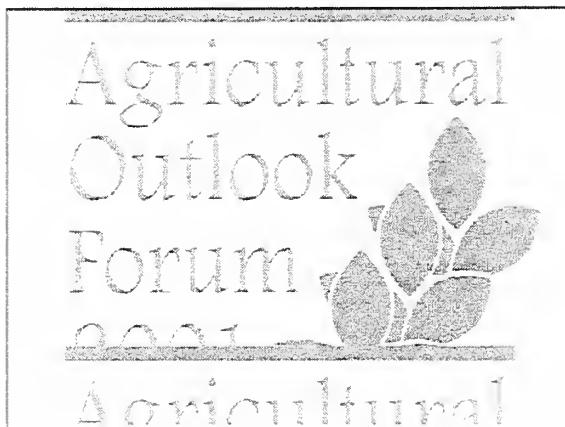
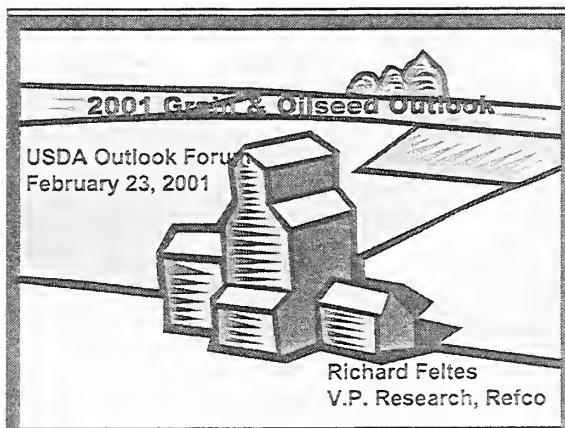


Duration of Current Downtrend in Grain Prices v. Prior Periods of Extended Price Weakness



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- Producers that haven't taken LDP and/or have grain under loan are indifferent to price signals
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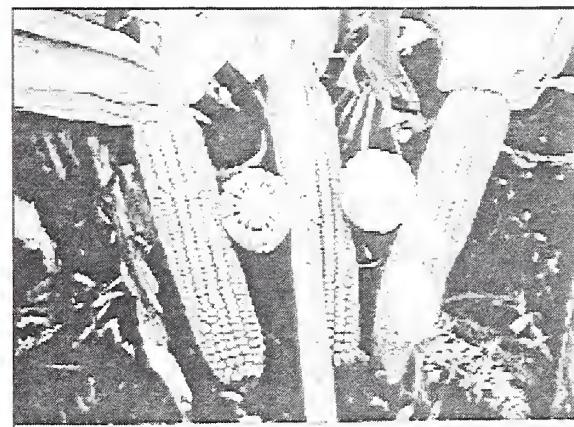


| USDA Outlook 2000 Est. of '00/01 Stocks vs. 2/01 Estimates & Forecasts for '01/02 | | | | | | |
|---|---------------------------|--------------|-------|-------------------------|---|--|
| | USDA Outlook 2/8/01 | USDA 2000 | Diff. | USDA Outlook 2001 | CZ, WN, SX, & BOZ '01 2/22 close vs. '00 2/25 close | |
| Corn | 1714 | 1891 | +177 | 1636 | +3 cents | |
| Wheat | 892 | 839 | -53 | 721 | +20 cents | |
| Beans | 510 | 345 | -167 | 475 | -51 cents | |
| Oil | 2345 | 2290 | -55 | 2420 | -.50 cents | |
| Grains - mil bu, Oil - mil lbs. | | | | | | |

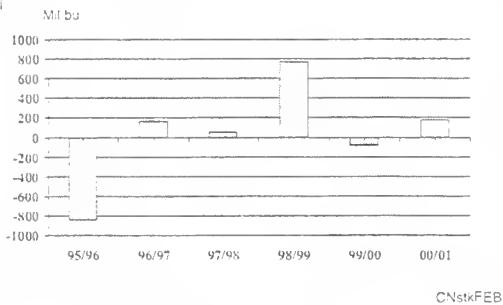
Trading Rule

- The successful trader bases no moves on what supposedly will happen but reacts instead to what does happen.

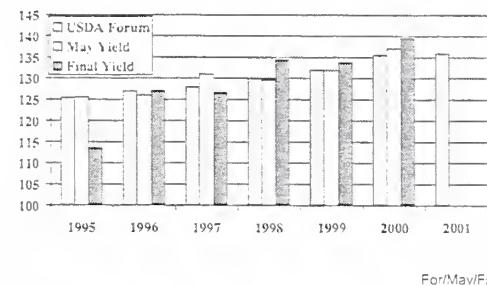
| Trade vs. USDA Estimates of '01/02 Stocks | | | | | | | | |
|---|-------|------|-------|------|---------|------|------|---------|
| | Refco | SCI | Fabri | FCC | Private | Avg. | USDA | Consult |
| Corn | 1951 | 1492 | 1719 | 1631 | 2000 | 1759 | 1636 | |
| Wheat | 755 | 812 | 757 | 672 | 770 | 753 | 721 | |
| Beans | 567 | 655 | 393 | 489 | 570 | 535 | 475 | |
| Oil | 2395 | 2406 | 2294 | 1985 | N/A | 2270 | 2420 | |
| Grains - mil bu, oil - mil lbs. | | | | | | | | |



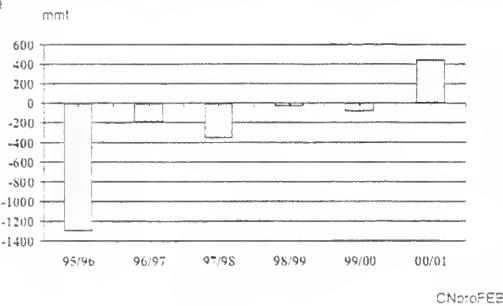
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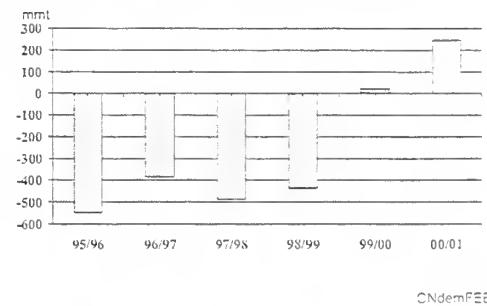
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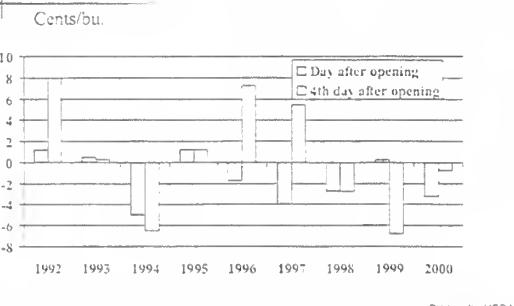
Final US Corn Production vs USDA Feb Outlook Forecast

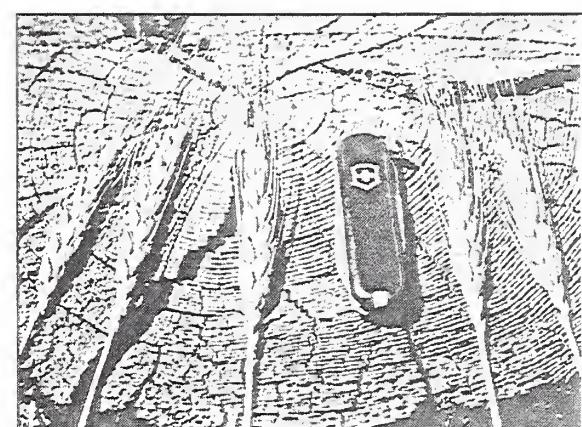
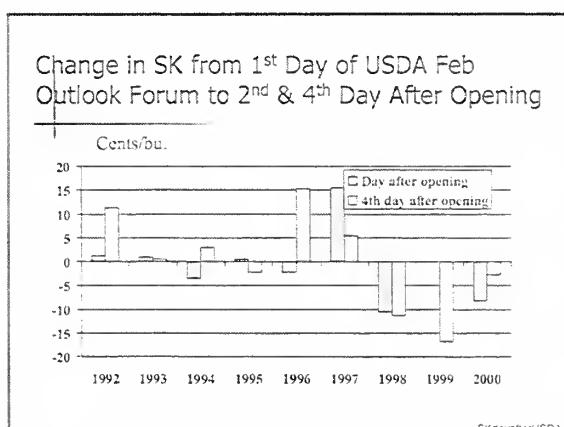
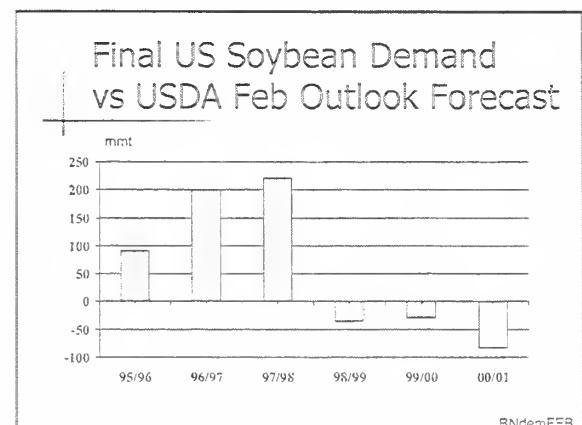
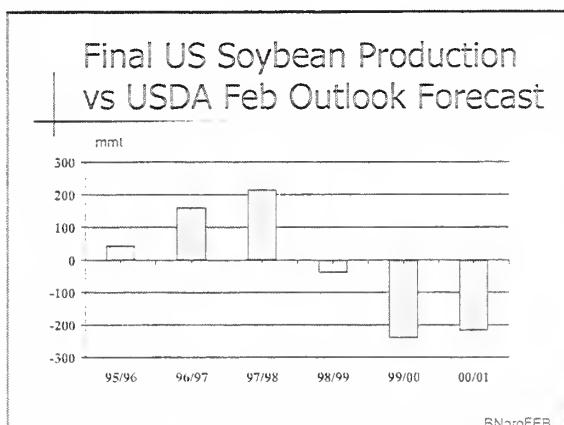
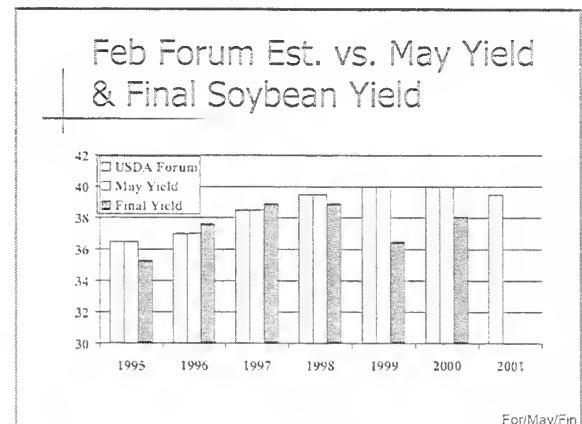
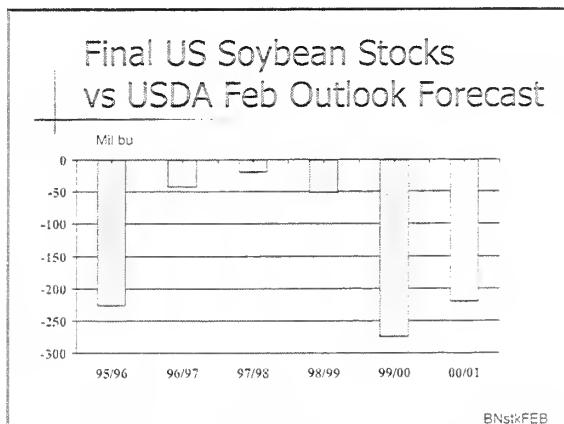


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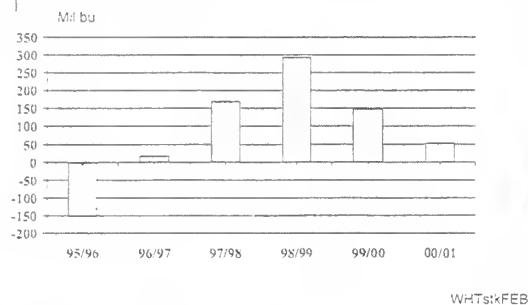


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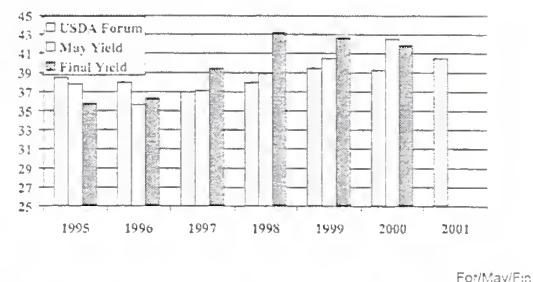




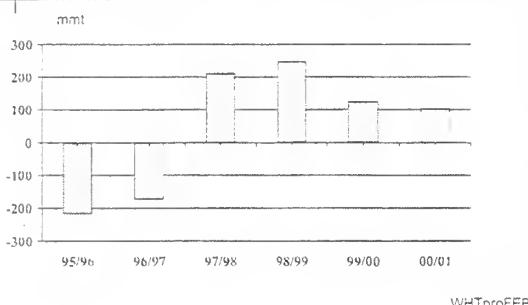
Final US Wheat Stocks vs USDA Feb Outlook Forecast



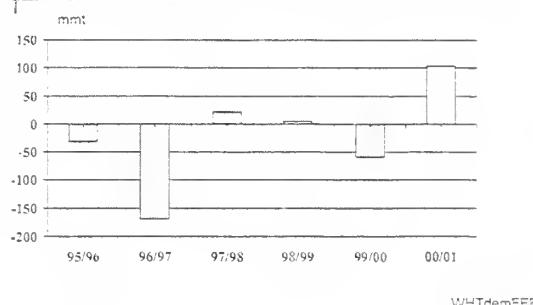
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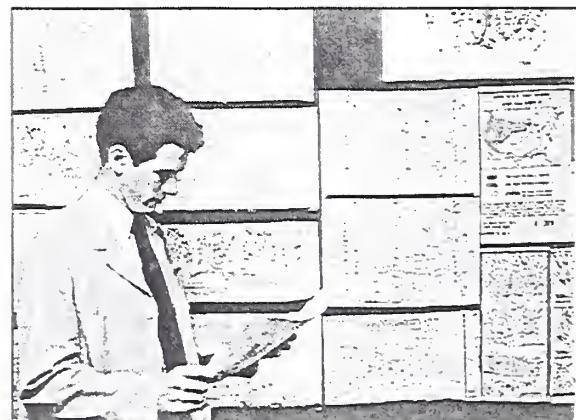
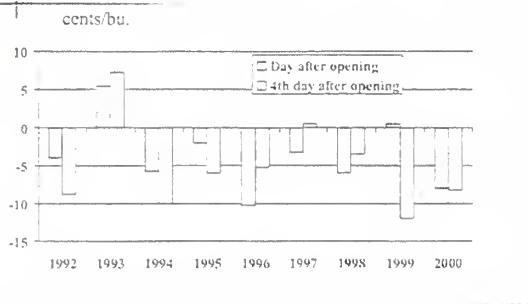
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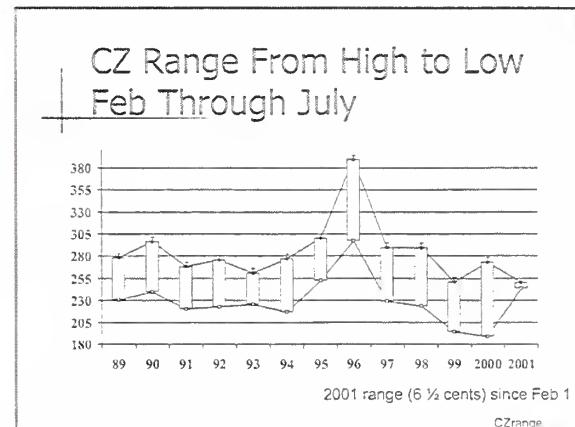
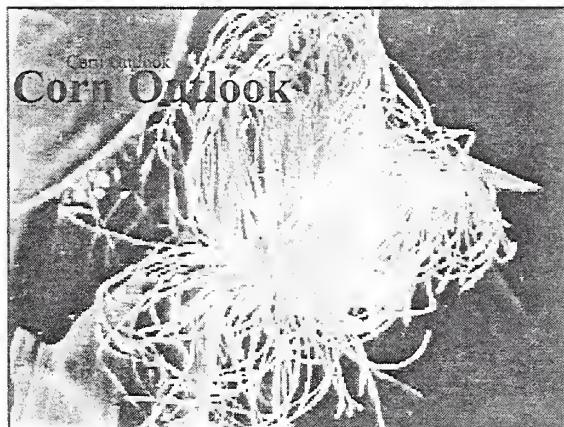
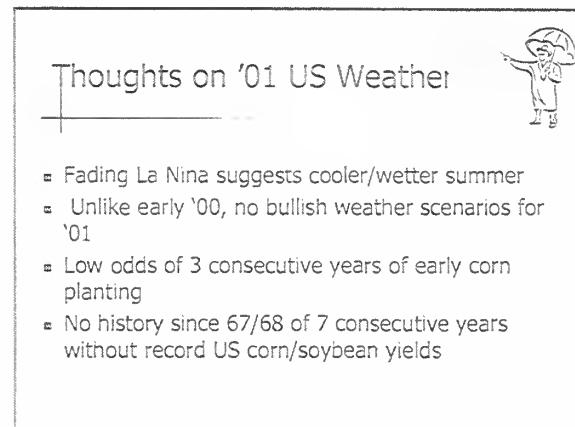
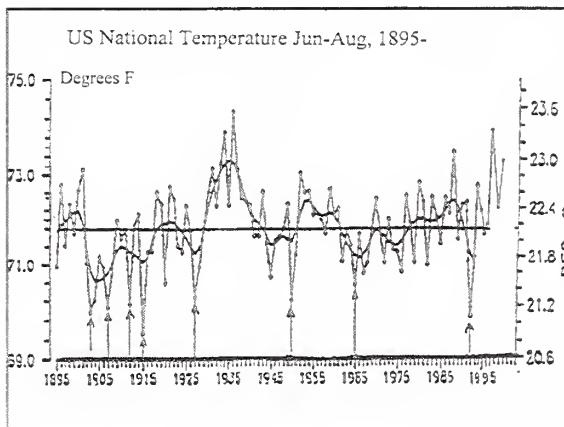
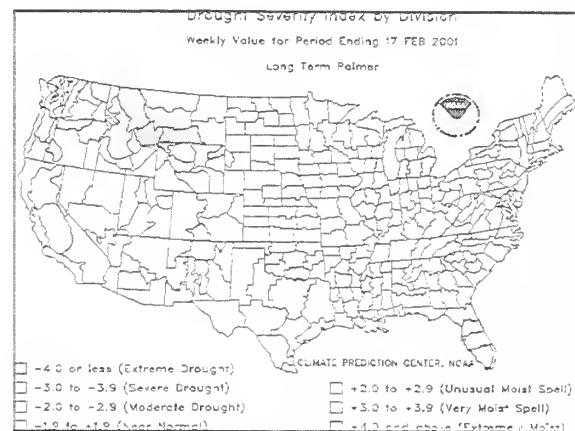
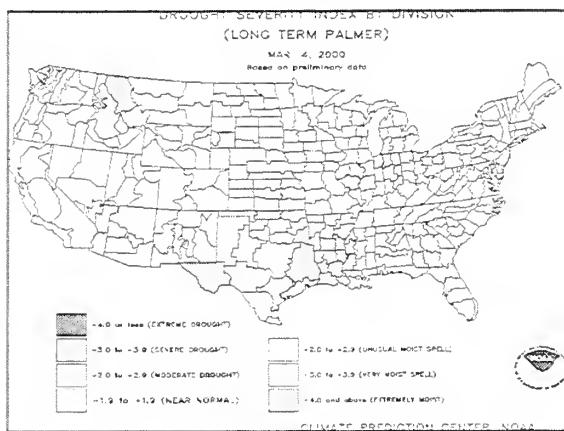


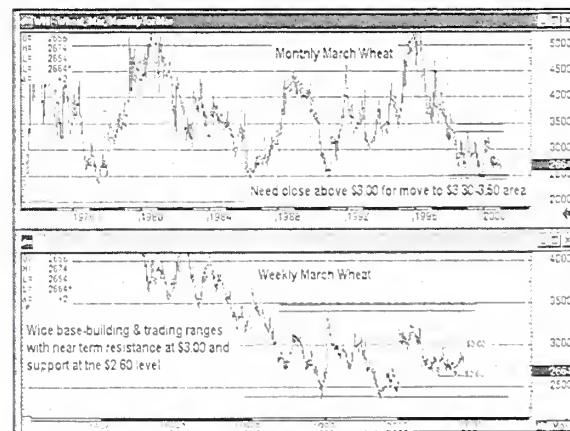
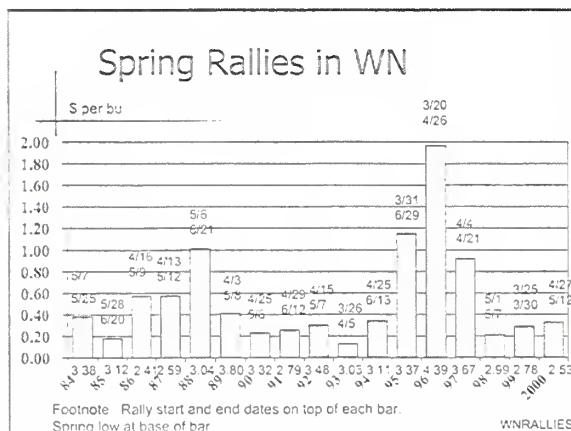
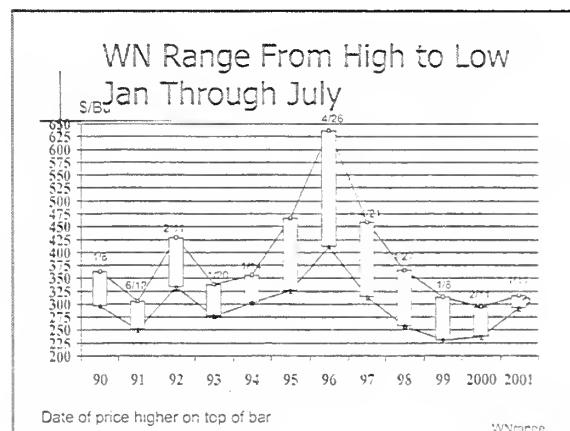
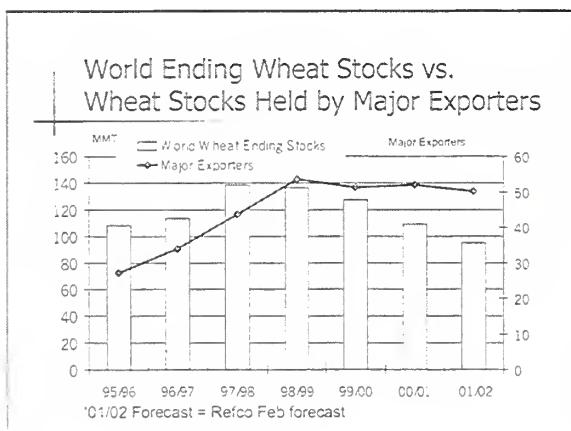
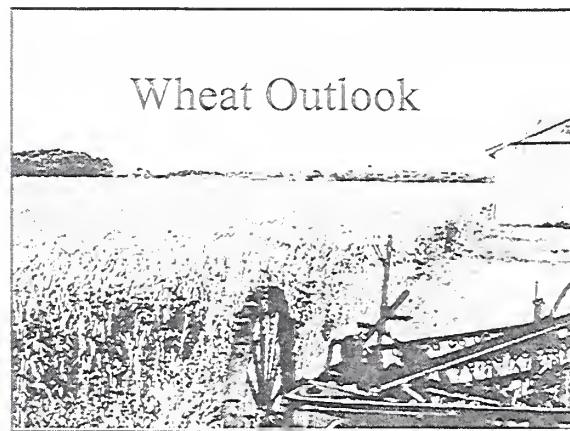
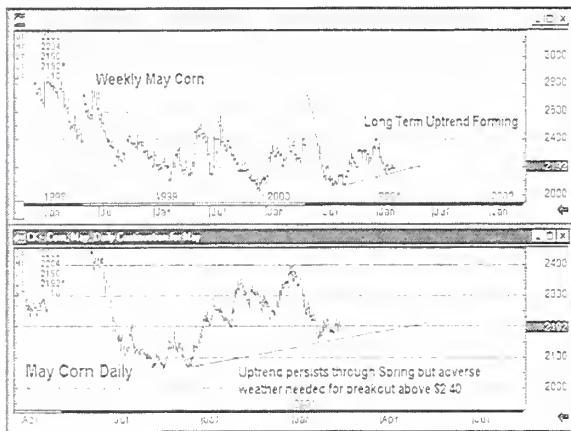
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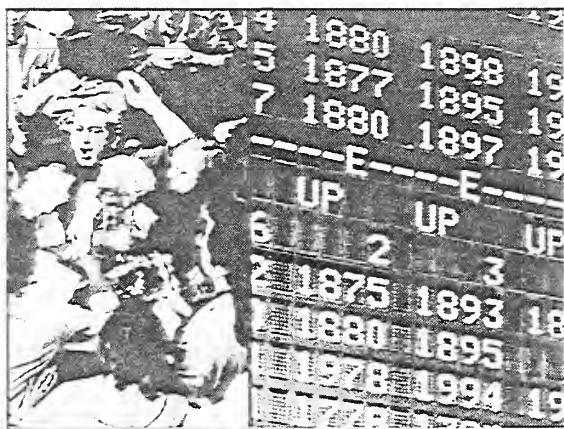


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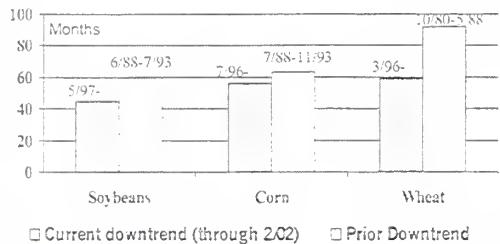


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Emerging Trade Practices and Trends in Fruit and Vegetable Markets

By

Dr. Roberta Cook
Department of Agricultural and Resource Economics
University of California Davis

My speech focuses on research findings from a recently released Economic Research Service (ERS) study I co-coordinated with Linda Calvin of ERS, entitled “U.S. Fresh Fruit and Vegetable Marketing: Emerging Trade Practices, Trends, and Issues.”¹ This study is one of three undertaken by ERS to assess the changing nature of the relationship between fresh fruit and vegetable shippers and food retailers, and the implications for competitive behavior. The study presented today was designed to identify and characterize the types of trade practices used in the produce industry, including fees and services provided by shippers, contracts, and other marketing strategies. The study responded to the growing national attention and interest in fresh produce trade practices.

Starting in 1999, the Federal Trade Commission and the U.S. Senate Committee on Small Business conducted hearings in which industry leaders, government officials, and academics offered their perspectives on how both the recent wave of supermarket mergers and the growth of new trade practices have affected various industries, including fresh produce (U.S. Senate, 1999 & 2000; Federal Trade Commission, 2000). Shippers are concerned that recent retail consolidation has led to market power and the growing incidence of fees and services. Retailers argue that these new trade practices reflect their costs of doing business and the demands of consumers.

Trade practices is a broad term that refers to the way shippers and retailers do business, including fees such as volume discounts and slotting fees (see box), as well as services like automatic inventory replenishment, special packaging, and requirements for third-party food safety certification. Trade practices also refer to the overall structure of a transaction—for example, long-term relationships or contracts versus daily sales with no continuing commitment.

¹ By Linda Calvin and Roberta Cook (coordinators); Mark Denbaly, Carolyn Dimitri, Lewrene Glaser, Charles Handy, Mark Jekanowski, Phil Kaufman, Barry Krissoff, Gary Thompson, and Suzanne Thornsbury. Market and Trade Economics Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 795.

This study compares trade practices in 1999 with those prevalent in 1994, placing them in the broader context of the evolving shipper/retailer relationship. To augment information that is publicly available, we interviewed 74 produce shippers, retailers, and wholesalers about their firms and trade practices. The interviews focused on seven products: California grapes, oranges, and tomatoes; Florida grapefruit and tomatoes; and California/Arizona lettuce and bagged salads. The retail and wholesale sample included eight national chains (three headquarter and five division offices), six midsize regional chains, and three large general-line wholesalers. The buying firms were queried about these same products so that shipper and retailer responses on trade practices for each of the respective products could be compared. Some highlights of the study follow.

Study Highlights

Retail Concentration. The 4 largest retailers' share of grocery store sales rose from 17 percent in 1987 to 27 percent in 1999, the share for the top eight rose from 27 to 38 percent, and the share of the 20 largest grew from 37 to 52 percent. Shippers are concerned about the accelerated pace of consolidation in part because market structure is still very fragmented at the shipper level for many commodities, implying low countervailing power relative to the fewer, larger buyers.

Shipper Concentration. While shipper consolidation is occurring, it varies significantly across commodities. For example, in 1999 there were 149 California grape shippers with none estimated to account for over 6 percent of total industry sales. In contrast, there were only 25 California tomato shippers, with the top four and eight shippers accounting for 43 and 70 percent, respectively, of total 1999 California tomato sales. While there were 54 bagged salad firms selling to retailers, the top 2 firms accounted for 76 percent of total fresh-cut salad sales in supermarkets. Hence, for a few fresh produce items, concentration of sales at the shipper level has surpassed that of retailers, even though the sales of these firms are still small relative to those of the large retail chains.

Many Factors Affect the Shipper/Retailer Relationship. Retail consolidation is not the only factor affecting the shipper/retailer relationship. Changes in consumer preferences for variety, convenience, and food safety; changes in technology; and changes in shipper

consolidation have all played a part in the evolution of the two industries and their interactions. For example, recent low f.o.b. prices experienced in the fresh orange industry are likely related in part to emerging consumer preferences for more convenient and often imported substitutes known as “easy-peelers,” such as clementines, independent of retail consolidation.

Number of Buyers. Despite perceptions to the contrary, when shippers reviewed their records, many found relatively small changes in the number of regular customers when considering all buyer types. While some shippers reported a decrease in the total number of customers, roughly as many reported an increase. Most shippers believed that the number of retail customers had declined, and the majority viewed this as harmful. Other shippers were selling to fewer but larger retail accounts and felt this reduced their transaction costs. With declining retail customers, most shippers thought they had less negotiating power and were more fearful of losing accounts if they did not comply with buyer requests. Some shippers were replacing retail accounts with other types of buyers, sometimes due to declining competitiveness in serving the needs of large retailers. In any case, many shippers are adjusting their marketing strategies to sell to other types of buyers.

Marketing Channels. The share of sales to conventional retailers was either stable or declining for all products. Regardless of how marketing channel shares changed over the 1994-99 period, direct grocery retail sales remain the most important marketing channel for sales of all the products studied except California and Florida tomatoes (tomatoes are typically sold to repackers servicing final buyers). Although the share of total sales to conventional retail buyers did not increase for any product in our sample, for grapes, oranges, and California tomatoes, the absolute dollar volume of sales to this channel did increase. This was due to growth in the total sales volumes for the sampled firms rather than an increase in the retail share of total sales.

Increasing Role for Mass Merchandisers. An important factor affecting the share of produce sold to grocery retailers is the growth in competition from mass merchandisers. The share of shipper sales to mass merchandisers, although starting from a small base, was up across all commodities with the largest gains in grapes, oranges, and grapefruit. The competitive effects of mass merchandisers on conventional retailers are evident in that the share of direct sales to conventional retailers was stable or declining in the face of the growth in direct sales to mass merchandisers, consistent with broad food industry trends. Combining mass merchandisers (also retailers) with conventional grocery retailers, the “retail” share of sales increased for every crop

considered except California and Florida tomatoes. This broader definition captures the evolving structure of the U.S. food marketplace in which a new type of retailer is playing a greater relative role.

Retail Buying - Corporate, Division, and Field Buyers. While consolidating retailers often cite the potential for lowering procurement, marketing, and distribution costs, many recently merged chains are still in the process of integrating their buying operations. Indeed, over the last 5 years, retailers reported that the number of their buyers remained fairly constant at the corporate and division levels, although 18 percent reported a decline in field buyers. As retailers fully integrate their acquired chains and implement new procurement models designed to streamline the supply chain, the buying practices of retailers may become more centralized than they have to date.

Importance of Largest Buyers. While the total number of buyers of all types may not have changed much for most shippers over the last 5 years, the importance of the largest buyers has increased, but only slightly. The share of the top four buyers of total shipper sales ranges from 22 to 45 percent of sales, depending on the product. The largest increase in this share was for Florida tomato shippers, from 34 percent in 1994 to 45 percent in 1999. Such dependence may compromise shippers' power in negotiating with buyers over prices and requests for fees and services.

Importance of Largest Suppliers. For their part, retail buyers reported quite concentrated purchases, with their top four suppliers providing from 85 to 97 percent of total purchases depending on the product. As retailers source from fewer suppliers, shippers will likely become more account-oriented in their marketing strategies, providing products and services tailored to the needs of specific large accounts. These trends may be consistent with greater payment of fees; as the value of the business generated by individual accounts grows, suppliers may feel increased incentives to comply with fee and service requests to gain or keep the business.

Daily and Advance Sales. Traditionally, the fresh produce industry has concentrated on daily sales. For commodities (grapes, oranges, grapefruit, and tomatoes), daily sales remain the most important sales mechanism across all types of buyers, but the share declined from 72 percent in 1994 to 58 percent in 1999. The use of advance pricing arrangements for promotions

increased from 19 to 24 percent over the same time period and it appears that the number of weeks in advance for which prices are fixed has grown as well.

Use of Contracts. The use of contracts is also becoming more common as a means for managing risk. The emergence of forward contracting in the produce industry is a reflection of the growing emphasis on supply chain management. This procurement model is designed to more closely coordinate supply and demand and reduce non-value adding transaction costs. The point of distinction (between contracts and daily sales) is ongoing sales and marketing agreements with buyers versus single shipments. In 1999, short-term contracts accounted for 11 percent of total commodity sales (grapes, oranges, grapefruit, and tomatoes) through all marketing channels, and long-term (annual or multiyear) contracts 7 percent. Between 1994 and 1999 growth came entirely in the use of long-term rather than short-term contracts. Indeed, mass merchandisers apparently substantially reduced their use of short-term contracts in favor of long-term contracts over this period. Our commodity shipper sample reported that 29 percent of their sales to mass merchandisers were under long-term contract in 1999, compared to 13 percent in 1994, while short-term contracts declined from 48 to 41 percent of the sample's sales through this marketing channel. Lettuce sales mechanisms through all marketing channels in 1999 were similar to other commodities, except all contracts were long term. Bagged salad shippers indicated that annual or multiyear contracts are the standard for retail sales.

Contract Mechanisms. Contract mechanisms for managing price and volume varied but the most common arrangement, accounting for 29 percent of the contract types reported, was fixed price contracts with minimum volumes, followed by fixed price contracts with a volume range, at 23 percent of the total. Automatic inventory replenishment contracts were also becoming more common, representing 14 percent of the contract types and indicating the growing importance of mass merchandise channels, where these are most commonly used. Forward contracting mechanisms are expected to continue to evolve as firms grapple with the challenges of managing risk and profitability in the sale of perishable commodities where weather can substantially and unexpectedly affect supply, demand and quality, generating serious ramifications for market prices.

Fees and Services. Most shippers and retailers reported that the incidence and magnitude of fees and services associated with transactions had increased over the last 5 years; a few tomato shippers reported no change. Data were collected from commodity shippers on actual

fees paid to the top five retailer and mass merchandiser accounts. They were usually around 1-2 percent of sales for most commodities. Bagged salad firms reported a range of fees paid of 1-8 percent for all retail accounts. Fees paid to all retailer and mass merchandiser accounts averaged \$5,200 and \$8,700 per million dollars of sales, respectively, for the interviewed grape and orange shippers, compared with \$10,100 for the grapefruit shippers and only \$1,300 for California tomato shippers. Fees can make the difference between profit and loss, especially for commodity shippers who act as price takers and are therefore less able to pass costs along to customers. Services per million dollars of sales were less than fees for all the commodity samples, averaging from \$1,200 for grapes to \$4,400 for grapefruit. However, many firms did not keep close track of the cost of fees and, in particular, services. This is likely to change if fees and services continue to grow.

Types of Fees. Overall, 48 percent of the types of fees requested were new in the last 5 years. The most frequently paid type of fee is the volume discount, a trade practice that has been used for years, although shippers agree that the incidence and magnitude of this fee has increased. Shippers generally viewed this fee as having a negative or neutral impact on their business. Still, volume incentives have the potential to promote a more stable relationship between suppliers and retailers; as the retailer buys more units from the supplier, costs per unit decline, providing an incentive for the retailer to buy larger quantities (over the season) from a particular supplier. Shippers may also gain efficiencies in marketing by increasing the size of accounts. However, many shippers felt that volume discounts make more sense as a trade practice for branded food products than for produce commodities, arguing that they don't sell off of a list price with built-in profit margins.

Slotting Fees and Fresh-Cut Produce. While slotting fees (defined, in this case, as an upfront fee to gain retail shelf space for a new or existing product) have long been used in the grocery store outside of fresh produce, they recently entered the fresh produce department with the advent of fresh-cut fruits and vegetables. Slotting fees are now common for fresh-cut produce and may be either requested by retailers or offered by shippers. Most bagged salad shippers reported that it was shippers, not retailers, who first introduced slotting fees to this industry in an attempt to buy market share from their competition, and that the fees began prior to the last wave of retail consolidation. None of the bagged salad shippers revealed the exact size of the slotting fees requested or paid by their firm or for individual accounts, but several talked about the general use of slotting fees in the bagged salad industry. Slotting fees were reported to range from

\$10,000-\$20,000 for small retail accounts to \$500,000 for a division of a multiregional chain, and up to \$2 million to acquire the entire business of a large multiregional chain. Some bagged salad firms have shifted to selling private-label product rather than their own brands because slotting fees are not used in that segment of the industry.

Slotting Fees and Commodities. Commodity shippers fear that slotting fees will become standard practice in their industries now that they have been introduced into one section of the produce department. However, in contrast to fresh-cut shippers, none of the commodity shippers reported paying slotting fees as defined above. A few were asked to pay though, and some lost accounts when they failed to comply. In addition, a few paid fixed, upfront promotional allowances and equated these with slotting fees. While lettuce shippers did not pay slotting fees, they have felt the effect. Shippers paying slotting fees for bagged salads and also selling lettuce were thought to have an advantage over lettuce-only shippers because buyers were receiving, in effect, slotting fees on a bundle of products.

Types of Services. Service requests are also increasing, with 77 percent of requests reported as new in the last 5 years. According to shippers, the most common service requested is third-party food safety certification, with one-third viewing it as harmful and the remainder feeling that the impact of providing this service is beneficial or neutral. Despite all the recent attention given to category management in the produce industry, only 28 percent of shippers reported having received a request to supply this service, with 19 percent actually providing this kind of technical support to retail clients.

Comparing Fees and Services. Shippers tended to believe they receive more benefits from providing services than from paying fees. Hence, 79 percent of service requests were complied with, compared to only 58 percent for fees. The consequences of non-compliance were greater for fees than services, with 41 percent of fee requests not complied with resulting in lost accounts, compared to 21 percent for service requests.

Adverse Effect on Smaller Shippers. Fees and services can more adversely affect smaller shippers if they are fixed and equal in cost across all shippers. While fees are generally per-unit costs, services are mainly fixed costs and so may be more difficult for small shippers to implement since they are spreading the costs across fewer units. If requests for fixed fees and services grow, smaller shippers may need to seek alternative buyer types. Preliminary canvassing

of shippers for this study indicated that smaller shippers were already selling very little to retail buyers. Aside from the issue of fees and services, small shippers are generally unlikely to provide adequate volume to supply large retailer needs.

Conclusions

Current concern focuses on the potential for slotting fees to enter the commodity side of the fresh produce industry. However, all types of fees can affect a firm's bottom line. Commodity firms do pay fees, and they are increasing. In 1999, fees of all types averaged about 1-2 percent of sales for most commodity shippers, but ranged from 1 to 8 percent for bagged salad shippers. Given low margins in the fresh produce shipping industry, these fees may be sufficient to determine whether a firm earns a profit or loses money over the course of a season. Hence, this research demonstrates that a focus on slotting fees is far too narrow when examining fees paid by shippers.

Why are fees and services increasing in incidence, magnitude, and type? What lessons can be learned from the experiences of the products studied here? A one-size-fits-all explanation is most likely a simplification. We can say that, in general, the relationship between shippers and retailers has changed, but only partly due to retail consolidation. Retail consolidation does not necessarily lead to market power. Market power may, indeed, play a role in new trade practices but that is an empirical question to investigate. Fees and services are also a function of several complex factors such as changes in consumer demand, technology, supply and demand conditions, shipper marketing strategies, buyer procurement strategies, the structure of the shipping and retailing industries, and the level of interfirm rivalry.

Another pressing question is whether slotting fees will eventually become common in commodity transactions. Bagged salad shippers, as sellers of a differentiated, branded product requiring dedicated shelf space year round, are more able to incorporate slotting and other types of fees into their pricing structures and may find that slotting fees can provide a benefit to their firms in terms of acquiring shelf space. In contrast, commodity shippers as price takers are less able to incorporate slotting and other types of fees into their cost/pricing structures so incentives are low to offer slotting fees as a strategy for capturing market share from competing suppliers. Even if retailers have market power, it may be difficult to apply slotting fees to commodities unless and until they are available year round from a relatively consolidated shipper structure.

Hence, while current conditions in the commodity side of the business may not lend themselves to slotting fees, this may change. If more commodity shippers consolidate or form strategic alliances to match the needs of fewer, larger buyers and become year-round operators capable of supplying large, consistent volumes with the quality specifications desired by individual accounts, it may be easier for retailers to request slotting fees. However, if a consolidated shipper structure were to prevail, it is not a given that slotting fees would become the norm since countervailing power could help shippers resist these fees. The intensity of interfirm rivalry becomes critical at this point; with shippers either capable of resisting fees or offering them as a strategy for capturing market share from competitors. On the other hand, if retailers focus on supply chain management approaches where they operate more in partnership with preferred suppliers, slotting fees may be less of a factor.

Finally, the research highlights the evolution of the produce industry toward a more vertically coordinated marketing system with many sellers attempting to provide more services and greater volumes of consistent quality produce to meet the needs of increasingly larger retail buyers. For many commodities large buying firms are becoming more dependent on a few key shippers capable of meeting their more complex needs. Smaller and medium size shippers are often selling more to other types of buyers, including wholesalers, foodservice and independent retailers. However, consolidation is also occurring in wholesale and foodservice channels, highlighting the future need for smaller shippers to target markets in which they can compete effectively. The diversity of fresh produce (more than 350 items/varieties sold) and consumer segments continues to offer opportunities for niche players with focused marketing strategies.

Slotting Fees

One of the retail fee types most of concern to fresh produce shippers is slotting fees, where suppliers are charged for access to shelf-space, usually for new products although suppliers may also pay slotting fees for existing products, commonly referred to as pay-to-stay fees. Slotting fees, common to manufactured grocery products, have not traditionally been used in fresh produce departments. Manufactured grocery products are generally available year-round from the same supplier with consistency in quality, sizing, volumes and pricing. Manufacturers are generally not price takers, exercising control over pricing and able to pass along fees to buyers by incorporating them into their pricing and allowance structures.

In contrast, fresh produce commodities are generally produced seasonally, often by different suppliers in different seasons, intra- and inter-seasonal quality and sizing may vary, weekly volumes may be inconsistent, and individual shipper volumes may be low relative to retailer needs. All of this means that retailers often can't procure all or most of their volume from one or limited suppliers. Furthermore, as price takers shippers have less ability to incorporate slotting and other types of fees into their cost/pricing structures so incentives are low to offer slotting fees as a strategy for capturing market share from competing suppliers. Several of the above factors also act as disincentives to retailers charging slotting allowances for most fresh produce commodities, as retailers are accustomed to using multiple suppliers for the same commodity, rather than locking in shelf-space for a specific supplier on a year round basis.

On the other hand, over the last decade the introduction of fresh-cut and branded fresh produce has stimulated the emergence of slotting fees in this segment of the fresh produce department. Value-added produce is produced and marketed much more like other manufactured grocery products, requiring dedicated year round shelf-space. Therefore, these items lend themselves to slotting fees, both from the perspective of retailers and suppliers that may find their usage helpful in market share battles with competitors. Hence, despite the current high profile of slotting allowances in the fresh produce industry trade press, they are not prevalent beyond the fresh-cut category where they may be supplier as well as retailer induced.

OPPORTUNITIES FOR BIOBASED PLASTICS

Barbara A. Miller
Technical Director
The Dow Chemical Company

Good afternoon, and thank you. It is a pleasure to be here and share with you my thoughts on opportunities for biobased plastic products in the chemical industry. Looking at the effect of biotechnology on our industry, five major thoughts come to mind:

- 1) If history repeats itself, biotechnology, like other new sciences in the past, will not evolve exclusively in a life sciences mode. Instead, it will converge seamlessly with other sciences to create new applications and even new industries.
- 2) This technology is potentially disruptive. It will compete with existing chemical technologies at a low level for some time and then roll forward in a groundswell.
- 3) Evidence for this evolution exists already. There are many examples of biotechnology's ability to create innovative new products and processes.
- 4) This technology is not mature; it has many missing links that need to be worked on.
- 5) And finally, as an industry or industries, we need to take collectively all the public policy actions that allow the power of the technology to unfold.

Convergence

So, let's first go to the notion of seamless convergence of biotechnology with other sciences. The 20th century is known as the century of physics and chemistry. These were the dominant sciences that fed on each other to create an endless stream of new materials, products, processes, and equipment at ever-higher performance and at ever-lower cost. Without chemistry, no pharmaceutical industry. Without silicon, no information technology.

The 21st century is already earmarked as the century of biotechnology. The addition of biotechnology to an already impressive arsenal of sciences will over time impact every facet of our lives. This co-evolution and convergence has begun: bioethanol as energy, genetically enhanced seeds for improved food, biomaterials, biopharmaceuticals are all for real already; biosensors and biocomputers are on the lab bench. The power of this technology is much broader than just Ag, nutrition and pharma.

Convergence takes time. All of the major chemical discoveries that make up today's large uses were discovered in the 30's, 40's and early 50's. It took the chemical industry 30-40 years to convert the initial scientific discoveries into reliable and large-scale use. By large-scale use, I mean low cost and high performance materials, made with safe production technologies and used with Responsible Care®. As examples, nylon and polyethylene were

discovered in the late 30's. These initial products had nothing in common with the packaging materials or clothing fibers we use today. Only a massive amount of new science and new knowledge enabled this performance improvement over time.

Disruption

For the chemical industry, biotechnology is likely to be disruptive. This is what a study by the National Research Council of the U.S. predicts. The prediction of 10 % liquid fuels and 25 % organic chemicals production from biofeedstocks by 2020 is viewed by many as very reachable, if not conservative. Today, 1-2% of liquid fuels is made up by essentially bioethanol. For organic chemicals and polymers, 10% of today's world production is biofeedstock based. These are mostly fermentation based organic and amino acids, enzymes, bulk antibiotics, vitamins and the like. The current worldwide production of fermentation based products including bioethanol is already 10 billion pounds, worth about 4.5 billion dollars and growing at 7-8% yearly.

The oil based chemical industry we know today was rapidly built to an enormous scale, turning out low-cost products with good quality and applications profiles. The key competencies developed over the years were catalysis, chemical engineering and material science. It is easy to visualize a possible future duality in feedstock's and processes. The existing commodity grain and oil processing infrastructure produces the carbohydrates needed for bioprocessing in the form of sugars. Technology and specialty processing is put in place in order to also use plants as factories and express specific oils, biopharmaceuticals or polymers in identity preserved crops. However, bioprocessing is significantly different from conventional chemical processing, with operations conducted on mostly solid feedstocks without pressure or heat and mostly in an aqueous medium.

In order to participate in this future duality in feedstock's and processes, Dow's Industrial Biotechnology Business Vision is to transform renewable resources into existing or new value added products. Our core strengths in process engineering and low cost production provide us a competitive advantage in new product development from biotechnology.

Let's take a closer look at large scale bioprocessing. In order to be useful economically, biocatalysis, either fermentation or enzymatic conversion needs to be matched with efficient bioreactor, separation and recovery designs. As mentioned already, the dilute aqueous media operation adds a lot of cost. So the challenge is not to lose the benefits of low-cost biobased feedstock's through excessive downstream processing costs. And plant expression has similar engineering challenges in separation and recovery. The advent of genetically enhanced host systems in the late 90's that brings about new exciting prospects for the chemical industry. New enabling technologies create an enormous diversity potential for biocatalyst discovery and development. In addition, metabolic engineering enables pathway shunts and elimination of side products, thereby improving yields and reducing separation costs. These capabilities will result in a dramatic upgrade of the bioprocessing tools available

So, looking ahead, we can identify three major driving forces that will create disruptive change in the chemical industry: First, biotechnology is a powerful source of innovation for new products. New products are the lifeblood of companies, critical to business renewal and growth. And they respond to profound societal aspiration, by now even expectation. Second, biotechnology can demonstrate improved economics. Not only lower feedstock costs, but also lower investment and operating costs. Significant potential business value can be captured here. Finally, there is the promise of products with reduced environmental footprint.

Innovation/New Product Development

Let me now give a few examples, from Dow that illustrate the progress being made. New plastic product opportunities are envisioned from bio-derived oleochemicals. Convergence of Dow's low cost processing expertise with bioderived materials offer the opportunity to develop products with new attributes or lower cost plastics for existing markets. Discovery R&D is occurring now through an Oilseed Engineering Alliance to discover options for enhancing plant oils so they can be used to replace traditional petrochemical based raw materials in chemical manufacturing.

The next example is one of a large volume, lower price product. Last January, Cargill-Dow announced the construction of a 300MM pounds polylactic acid plant and 400MM pounds lactic acid unit. Polylactic acid is the first polymer produced from renewable resources that competes with high volume products such as Nylon, PET and polyethylene and this in a multitude of large applications. The production process involves dextrose fermentation to lactic acid, followed by a dehydration to lactide. Polymer production takes place in a conventional polymerization process using a chemical catalyst. The dextrose to lactic acid route has 100% theoretical yield and conserves all the carbon, thereby making it an economically favorable configuration.

This slide shows some of the key performance attributes of PLA in a variety of packaging applications.

- in candy wraps, PLA replaces cellophane
- in bottles, PET
- in paper coating, polyethylene
- in rigid containers, again PET

This demonstrates quite a broad performance spectrum and a good price/performance value proposition for PLA! We see the same versatility in fiber applications. PLA competes advantageously with nylon and polyester and can be blended with other natural fibers such as cotton. Woven cloth made from PLA fibers has a silk like feel to it. It also unique wicking and moisture management characteristics, in addition to other valuable attributes.

Life cycle inventory data such as gross energy requirements shown on this slide gives a good measure of comparative sustainability of products. About a third of PLA's energy requirement comes from sunlight. So PLA's consumption of fossil

fuel energy compares favorably with all competitive products. And this data includes all energy needs from cradle to grave, from farming input for corn to the disposal of the material.

We see a lot of evidence that biotechnology and bioprocessing are becoming useful tools in the hands of chemical engineers. I showed you a few examples just now; and there is a lot more exploration and product development effort underway in oil, chemical and biotech platform companies. There are, however, some missing links on the way to a broader use base. This chart from the U.S. Council for Chemical Research describes the overall knowledge and experience base for the two sets of feedstock's and processes. The chemical processes using fossil fuels are mature, with decades of experience. Bioprocessing of renewable resource feedstock's is emerging, but still has a narrow working base.

To be truly successful, we will have to bulk up the lower right hand quadrant with substantially more knowledge. Just a few biotechnology challenges to be solved, by way of example:

- technology to access potentially fermentable sugars in lignocellulosic biomass
- single microbial systems to efficiently convert 5 and 6 carbon sugars
- biocatalysts which can operate in solvent media.

Public Policy

Our experience in the Chemical Industry has taught us that communication and outreach are the basis for transition and change management. It is vital to discuss our viewpoints and knowledge with all stakeholders. Trust and credibility is only built if safety is foremost on our mind and scientific uncertainty questions receive credible answers. Ours must be the highest standards of ethics at all times, documented by clear guiding principles and transparent industry behavior. And solidarity and performance by all industry peers or value chain members is what makes or breaks this effort. So, in analogy to the Chemical Industry, a set of Responsible Care principles will be an absolute must for future success of this technology.

In summary, I have talked this afternoon about convergence, disruption, innovation, missing links and public policy. These dimensions are relevant not only to the chemical industry, but in the end to all industries impacted by biotechnology. We need to manage the related change with vigor and creativity; only then will we speed up the process of acceptance of this new technology and deliver a truly revolutionary impact on society. Thank you.

Opportunities for Biobased Plastic Products

Agricultural Outlook Forum 2001

February 23, 2001

Barbara A. Miller

The Dow Chemical Company

022301 USDA Outlook (Miller)

1

Outline

From the chemical industry's perspective, biotechnology:

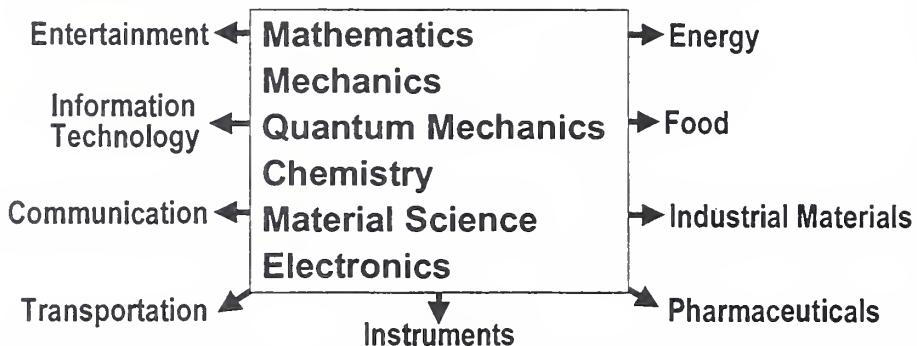
- Converges seamlessly with other scientific disciplines
- Is potentially disruptive
- Is a powerful source of innovative new products and processes
- Has missing links in technology
- Requires industrywide public policy actions

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2

Convergence

The 20th Century: Century of Physics & Chemistry



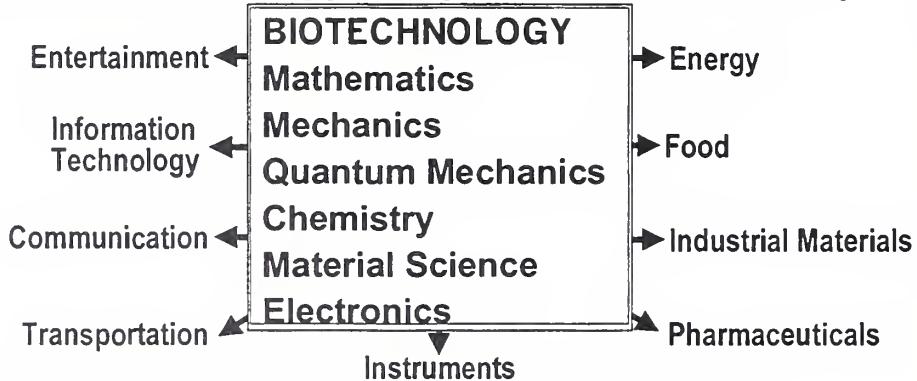
Co-evolution and convergence of different scientific disciplines create many new application opportunities with large societal benefits, both economic and scientific.

022301 USDA Outlook (Miller)

3

Convergence

The 21st Century: Century of Biotechnology, Physics & Chemistry



Co-evolution and convergence of different scientific disciplines create many new application opportunities with large societal benefits, both economic and scientific.

022301 USDA Outlook (Miller)

4

Convergence

Major Chemical Inventions

1930's

SB Elastomers
Polystyrene
PVC
PMM
Nylon 6, 6
Polyethylene

1940's

Antibiotics
Cat Cracking
Silicones
PTFE

1950's

ABS
Acrylic Fibers
Stereospecific
Catalysis
Polycarbonate
Semiconductor
Silicon

It took chemistry 30-40 years to convert the initial scientific discoveries into reliable and robust large scale use = low cost and high performance materials, made with safe production technologies, used with Responsible Care®.

022301 USDA Outlook (Miller)

5

Disruptive

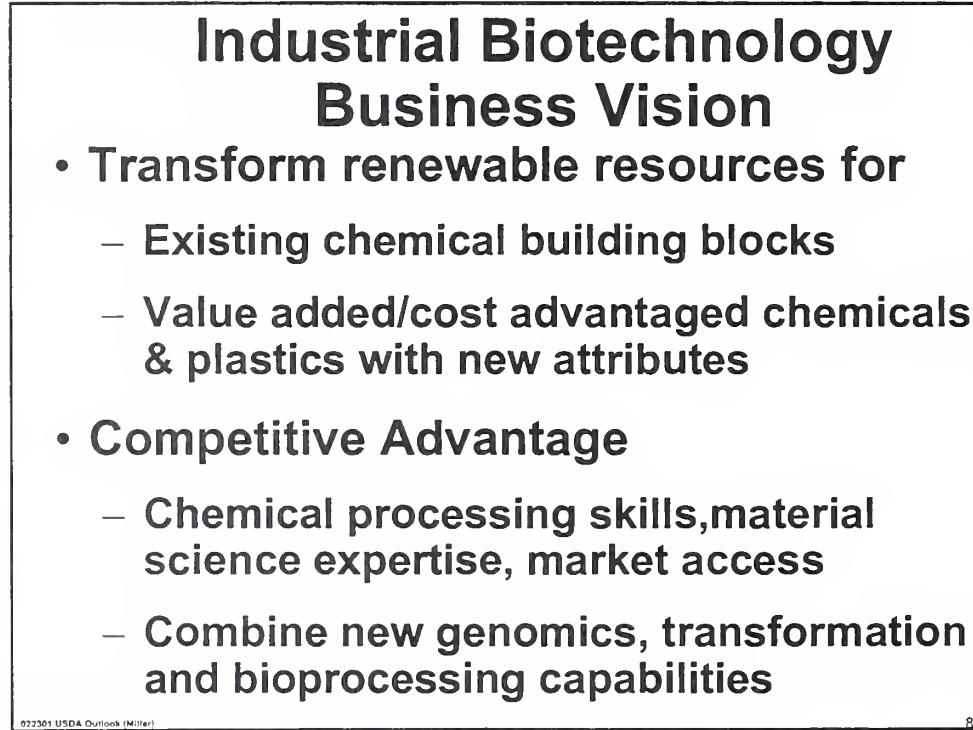
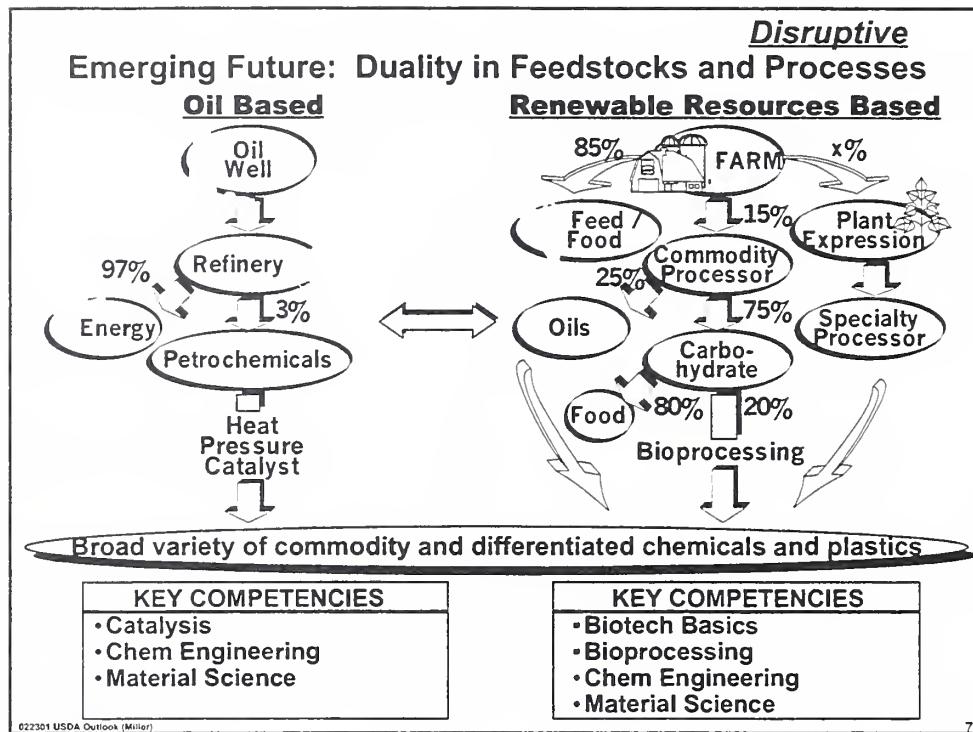
% Products Derived From Biobased Feedstocks

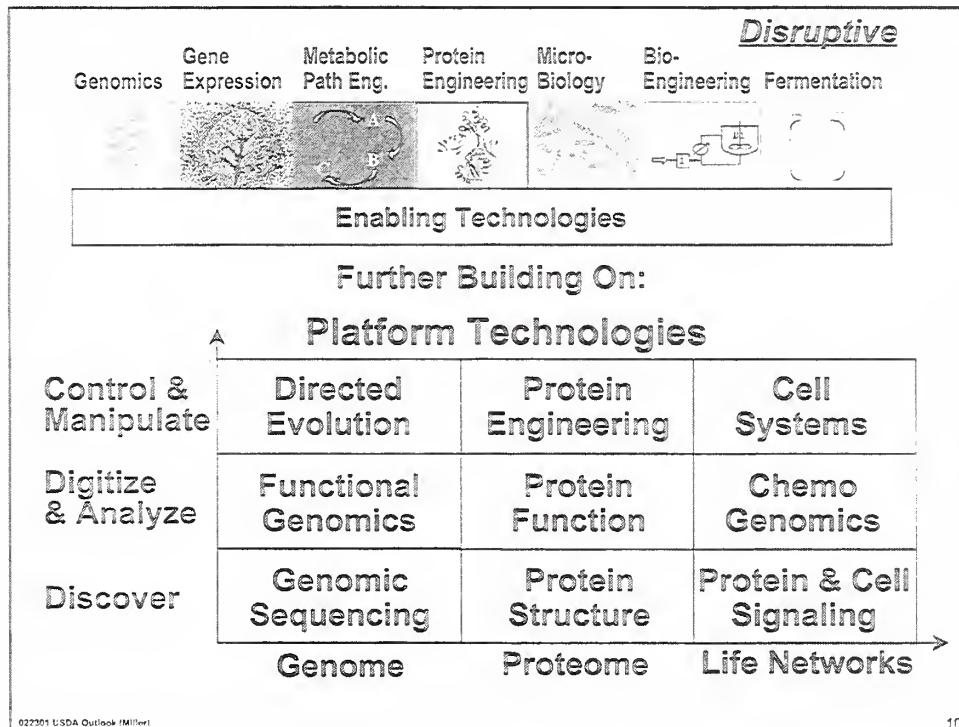
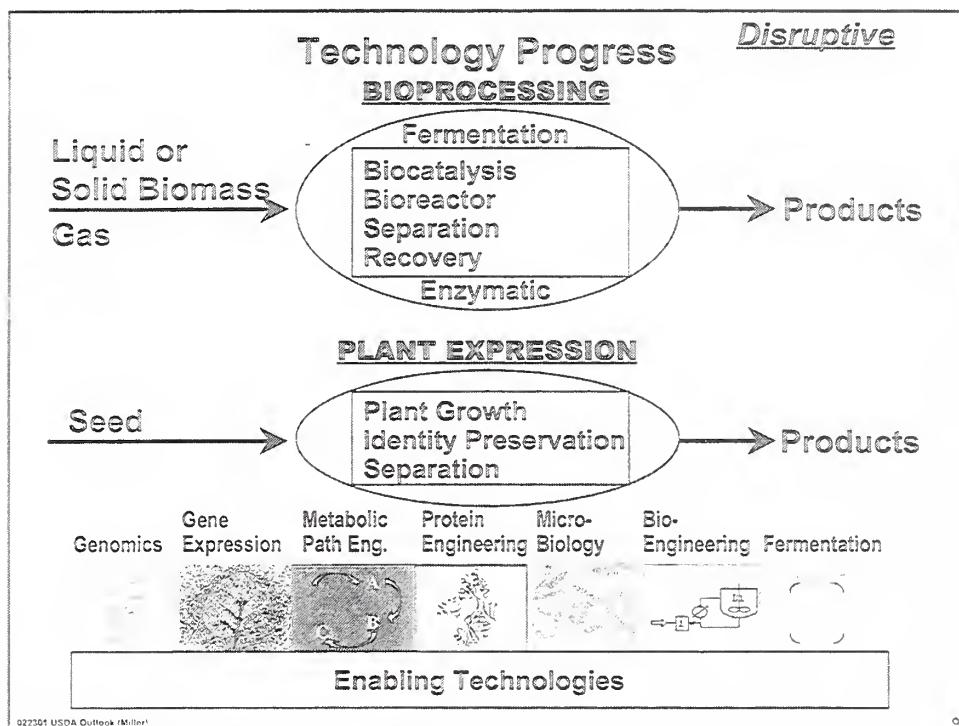
| | <u>2020</u> | <u>2090</u> |
|-----------------------------------|---------------|---------------|
| <u>Current</u> | <u>Target</u> | <u>Target</u> |
| Liquid fuels | 1-2 | 10 |
| Organic Chemicals, Polymers | 10 | 25 |
| | | 90+ |

NRC, Committee on Biobased
Industrial Products

022301 USDA Outlook (Miller)

6





Disruptive Biotechnology Driving Forces

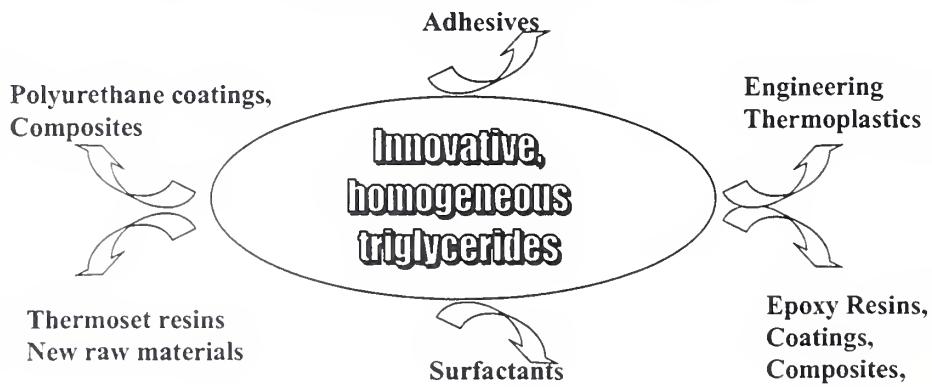
- Powerful source of innovation...new products
 - Business renewal and growth
 - Societal aspiration and expectations
- Improved economics...new processes with lower fixed/variable cost
 - Business value
- Products with reduced environmental footprint...renewable resources, reduced energy intensity, reduced emissions
 - Sustainability
 - Enhanced Responsible Care®

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11

Commodity Oils = Oleochemicals Molecular Architecture = Product Opportunities

- Triglycerides can be used to create performance materials at low cost

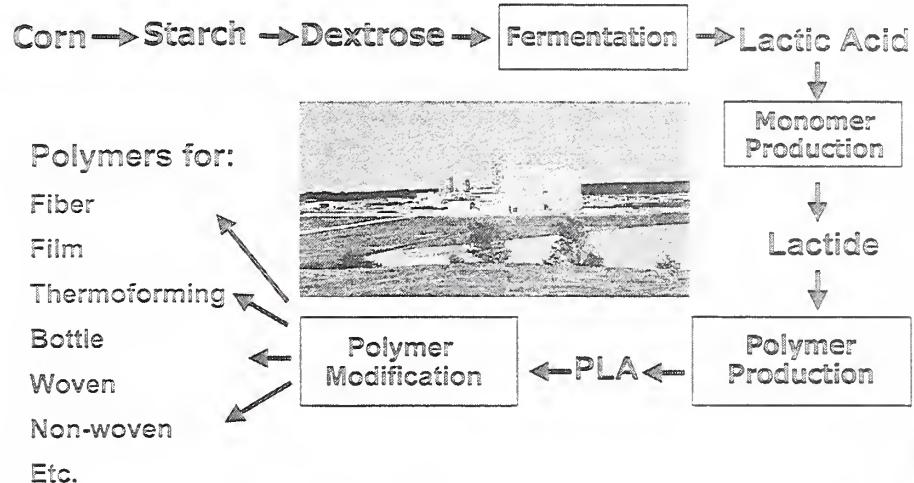


022301 USDA Outlook (Miller)

12

Innovative New Products and Processes

Polylactic Acid Polymers



022201 USDA Outlook (Miller)

13

Innovative New Products and Processes

Packaging Applications

Bottles



Coated papers



Films



Valuable Attributes

- Heat seal
- Clarity and gloss
- Stiffness
- Barrier - flavor, oil
- Processability

Rigid containers



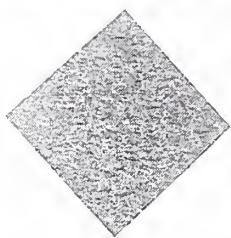
022201 USDA Outlook (Miller)

14

Innovative New Products and Processes

Fiber Applications

Carpet
Tiles



Industrial Fibers
and Nonwovens



Valuable Attributes

- Resilience
- Low flammability
- Processability
- Moisture management
- UV resistance
- Stain resistance
- No bacterial growth
- Natural based fiber



Apparel

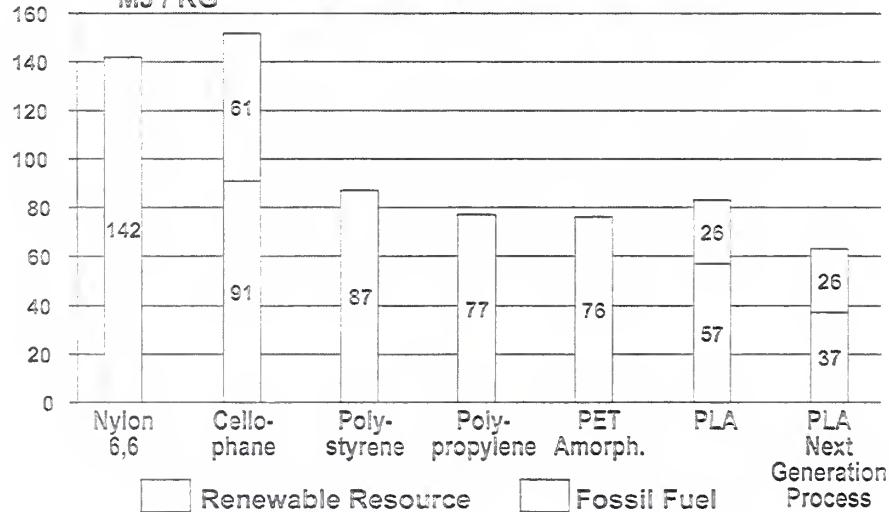


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15

Comparison of Gross Energy Requirements

MJ / KG

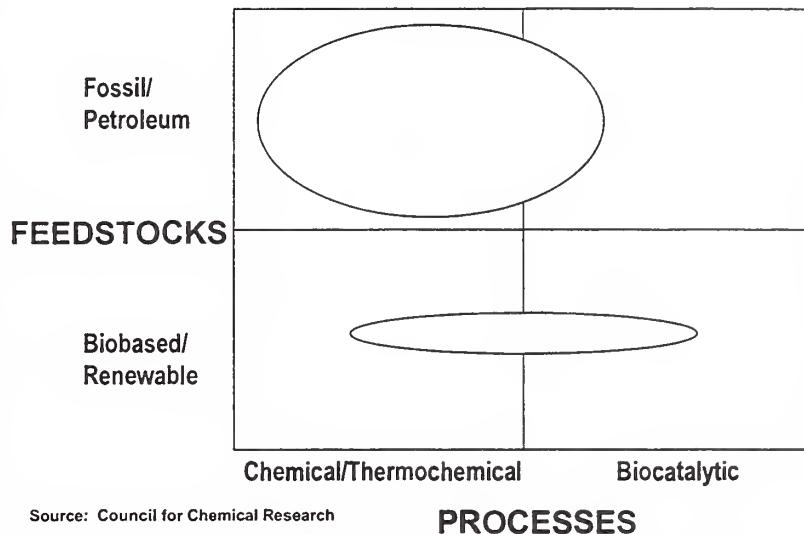


022301 USDA Outlook (Miller)

16

Missing Links

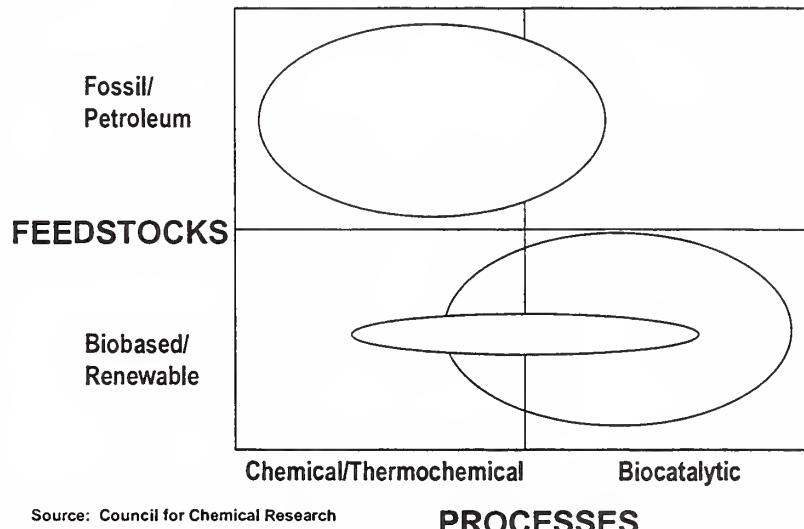
Science and Applications Knowledge Base



17

Missing Links

Science and Applications Knowledge Base



18

Public Policy

The Need for Industrywide Public Policy Actions

- Communication / outreach
- Government relations / regulatory
- Science priorities / safety
- Ethics, guiding principles / industry behavior
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THE MARKET FOR CARBON SEQUESTRATION: HOW REAL, HOW SOON, AND HOW VALUABLE FOR FARMERS?

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It is a pleasure to be invited here today to talk about carbon markets. I was given the task of trying to figure out if markets for reductions in carbon dioxide and other greenhouse gases are going to materialize and if so, how soon, and how important they will be. As with any potential market information, if I knew the answer to these questions, I would adjust my stock portfolio to make myself rich by speculating on stocks of companies that would be positively or negatively impacted by the creation or lack of creation of such markets. Given that the only adjustment I have made to my limited stockholding in response to global warming is the acquisition of stock in Ballard Fuel Systems—a fuel-cell company—and that the stock is down 35% since I bought the shares, I really am not overly confident about my ability to figure out what the future holds. However, I can review a bit of what is going on today and try to use this information to figure out how markets for reductions in greenhouse gases might emerge, and if they do, whether they might play a significant role in determining future agricultural income.

Will there be a market for greenhouse gas reductions?

A viable market for a good requires that the average willingness to pay for the good be less than the marginal cost of providing the good at some quantity. If costs are always greater than benefits, then the market is not viable. Clearly for carbon markets, the marginal cost of reducing carbon dioxide emissions at low quantities is close to zero. Just think about agricultural or forestry practices that reduce carbon emissions that are being willingly adopted now by a significant portion of the industry. Of course, as the quantity of carbon increases, so too do costs. But viability of a market simply requires that at some quantity, costs are less than benefits.

What about the demand side? Over the last few weeks we have seen news reports of retreating glaciers and new predictions of ever-higher future average global temperatures. Perhaps the evidence that is most compelling is the significant shrinkage in glaciers in the Andes, the Rocky Mountains, and the Alps. And it is predicted that Mount Kilimanjaro will lose its ice cap in less than 15 years. After reading these news reports for a number of years and seeing what the International Panel on Climate Change is concluding, it seems that the more the scientific community looks at the question of global warming, the more it seems to be concluding that global warming is occurring and the build-up of greenhouse gases is the primary culprit. This means that there is a potential demand for reductions in greenhouse gases. As evidence mounts, demand will grow.

Who is likely to demand reductions in greenhouse gas emissions from agriculture? There are at least four possible sources of demand for reductions in greenhouse gas emissions that could materialize. First, a ratified international agreement could commit countries to reduce greenhouse gas emissions. Such a scenario has the potential to create a large role for agricultural carbon sequestration and reduction in methane and nitrous oxide. Depending on the ability of other sectors to supply reductions in greenhouse gasses, significant income could be generated for agriculture and significant changes in land use practice could occur.

The second source of demand is the U.S. government. Congress could pass a farm bill that contained significant incentives for farmers to adopt carbon-sequestering practices, even in the absence of credit for agricultural sinks in the international community. Such a policy move could be justified because soil carbon is an indicator of long-term soil productivity and is likely correlated with many beneficial environmental attributes. Implementation of such a domestic policy may also demonstrate the feasibility of managing soil carbon as a way of reducing atmospheric concentrations. Depending upon how this policy is implemented, it too may have significant income generating potential for agricultural sources.

The third source of demand could originate from the U.S. Administration. Suppose President Bush wanted to stake out a claim that he is the environmental president. What better way to accomplish this than to announce the U.S. was going to unilaterally limit its carbon dioxide emissions, and following advice from its market-oriented Secretary of Interior and EPA Administrator, the limitations would be accomplished by a cap on emissions combined with a tradable permit program. Clearly, give the U.S. position in international climate-change negotiations in favor of counting carbon sinks would mean that agriculture would be included in such a permit program.

The last source of demand could be voluntary arrangements whereby emitters buy offsetting credits from farmers or their representatives. This demand would arise only if consumers are willing to pay extra for climate-change-neutral products.

International Treaty Obligations

Suppose the U.S. ratified an international treaty committing it to a hard cap on greenhouse gas emissions. As part of meeting the national goal, suppose each emitting firm is given a permit that allows a certain level of emission. Offsets would have to be purchased if emissions exceeded permitted levels. Immediately there would be a demand for reductions in greenhouse gases from agricultural sources to the extent that agriculture is a low-cost supplier of reductions.

This scenario is what most people have in mind when they are trying to determine if there will ever be a market for reductions in greenhouse gases. But will farmers have to wait for treaty ratification before there will be a demand for carbon credits? If so, then farmers will have to wait a long time because it seems unlikely that the U.S., as the largest emitter, is moving towards accepting the idea that it should reduce greenhouse gas emissions. But is there the possibility that demand for carbon could materialize before a ratified treaty fully commits countries to reduce emissions?

Consider the electricity sector of Canada. Suppose the sector has a market valuation of \$100 billion. Further suppose that the Kyoto caps of a 6% reduction below 1990 carbon emissions translates into a projected reduction in net profitability of 10% to the Canadian energy sector due to the need to either

purchase offsets or to move to less polluting means of generating electricity. This 10% reduction in profitability would take \$10 billion off the valuation of these companies. The uncertainty about the magnitude in the profit decline would also affect the sector's credit worthiness, leading to increases in interest charges.

What would be the response of the sector if Canada committed itself to meeting these emission reduction goals? The first response would be to find out if there were ways that the 10% reduction in profits could be reduced through more efficient means of meeting the Kyoto caps. The companies would be willing to invest up to \$10 billion to obtain lower-cost carbon, perhaps by asking U.S. farmers to sequester carbon in their soils or to capture the methane from hog lagoons.

But clearly, there is tremendous uncertainty about whether the Kyoto caps, or a close substitute will ever be put into place. In fact, most observers feel that it is unlikely that the caps will ever be put in place. But how likely is unlikely? That is, do these same observers place a zero probability on hard caps being put in place within the next ten years? How about a 20% chance? With a 20% chance, how much would the Canadian energy sector be willing to invest to obtain low-cost carbon? The answer is up to \$2 billion. That is, even a relatively small chance that the sector would be adversely affected by hard caps is enough to affect sector valuation and to free up funds to invest in alternative carbon projects. Why, then do we not see significant investments in alternative projects in U.S. agriculture? After all most people who follow the Kyoto events are placing non-zero probabilities on hard caps eventually being implemented.

The problem is that the international community has not yet agreed on the practices that if put into place, will serve to meet a country's treaty obligation. Does methane recovery from hog lagoons count? How about induced adoption of no-till on flat ground in Illinois? Nobody knows, so there is little interest in pursuing these types of projects. Will carbon sinks in forests and soils even count at all? Nobody knows, so firms are not interested in investing today.

If the U.S. wants private investment to start flowing into agricultural projects then it can push hard for countries to agree on steps if taken now, will be counted towards meeting a country's treaty obligations, if a treaty is ultimately negotiated and ratified. Private capital would begin flowing and the extent to which agriculture is a low-cost source of greenhouse gas reductions would be discovered. Without such assurance international-treaty-based investments will not be flowing to agriculture any time soon.

Demand from Farm Policy

A second source of demand might hold out more short-term promise for agriculture because the demander has shown that it is willing to spend large amounts of money in rural areas. This source of demand, of course, are USDA programs mandated by Congress. Why would Congress want agriculture to start supplying reductions in greenhouse gases? I can think of at least three reasons. First, at least some members of Congress need a reason to support agriculture. An annual declaration that agriculture is having an emergency is not enough justification for some in Congress.

Agricultural provision of environmental goods is one defensible reason for such support. Reducing emissions of methane and nitrous oxide, and sequestering soil carbon makes environmental sense even if no international carbon market materializes. Increases in soil carbon increase long-run soil productivity

and, if accomplished with conservation tillage, reduces sediment runoff. Decreases in nitrous oxide come about through increased efficiency of nitrogen fertilizer use. This increased efficiency also results in less nitrogen loss to rivers and lakes.

Establishment of an environmental objective for reducing greenhouse gas emissions in agriculture might also prove valuable as a means of developing the required protocols needed to demonstrate the feasibility of using soil sinks to mitigate greenhouse gas buildup. Much of the world is skeptical that high-quality carbon credits can be obtained from agriculture due to the non-point nature of supplies. A new carbon-friendly farm bill whereby USDA sets up programs to document increases in soil carbon and reductions in emissions could go a long way to obtaining international acceptance of the idea that agriculture can contribute, at least in the short run, to reductions in atmospheric buildup of greenhouse gases.

The likelihood that Congress will include significant environmental spending in the next farm bill depends on the extent to which Congress feels that it needs to justify farm income support payments to taxpayers. Are taxpayers in revolt over the \$50 billion in support payments that have flowed to farmers over the past three years? Will Congress feel pressure to justify these payments in terms of provision of a public good? If so, then farmers may want to start thinking about greenhouse gas programs. If not, then it is likely that the market for greenhouse gas reductions due to government involvement will not come to pass.

A U.S. Domestic Program?

Would it make sense for the U.S. to announce that it was going to unilaterally limit its carbon dioxide emissions to help fight global warming? On the plus side, such an announcement would immediately put other major emitters on the defensive. Currently, the U.S. is perceived as being the major roadblock to implementing an international agreement due in part to its insistence that carbon sinks be allowed to count towards meeting a country's obligations. I cannot think of a better way for the U.S. to strengthen its negotiating position than to implement a domestic program that demonstrated to the world that the cost of reducing carbon dioxide emissions does not have to be burdensome, and that carbon sinks are a viable way to reduce emissions today, while we develop tomorrow's cleaner energy technologies.

On the negative side, such a domestic program could, if designed poorly, significantly raise the cost of doing business in the U.S. After all, the cost of reducing emissions in some sectors is quite high. A program that did not allow low-cost sectors to immediately take responsibility for reducing U.S. emissions could be quite burdensome.

How likely is it that such a program could be forthcoming? It seems unlikely, given the Administration's public position that it wants to expand use of fossil fuels. But suppose the Administration judges that 1) global warming is real and is caused by human activities; 2) international pressure for a global treaty limiting greenhouse gas emissions will continue to grow; and 3) that it really is in the world's best interest to meet emission cutbacks through international emission trading mechanisms. Then the Administration could conclude that its best strategy would be for the U.S. to announce that it was going to take the offensive on global warming by bypassing the stalemated international talks and implementing its own domestic program.

Demand for Atmospheric Friendly Products

The last driver of demand for development of carbon markets would be demand for credits by companies that want to market their products as being “atmospheric friendly.” If the production of such goods involves significant emissions of greenhouse gases, firms could turn to brokers of carbon credits to buy emission offsets. The extent to which such green marketing campaigns works depends on how important the environmental issue is judged to be by consumers. For example, dolphin-free tuna resonated with U.S. consumers because of widespread admiration of playful dolphins frolicking in the ocean. Is it possible that global warming could evoke such concern? I do not see it right now. And a high level of concern may never materialize because the climate changes that are likely to take place will be gradual, leaving consumer perceptions time to adjust about what is “normal.”

But the enhanced ability of firms to segment markets and deliver relatively small quantities of goods to groups of caring consumers, could mean that there will be some demand for emission offsets. But unless we experience rapid and violent climate change, the impact on agriculture from this source of demand is likely to be quite limited.

Conclusions

Should farmers look to carbon markets in the near future for enhanced income? Probably not, given current trends. The U.S. does not seem to be moving closer to an international agreement that would allow carbon sinks to be counted towards emission reductions. And the private market for atmospheric friendly products does not seem to be developing.

However, two surprises could brighten the outlook. The first surprise would be if Congress decides that it needs to justify farm income support by meeting a broad public policy objective, rather than narrow political objectives. This could open the door to a farm bill that was much more oriented to meeting environmental objectives, including building up soil carbon levels, and reducing methane nitrous oxide emissions. The second surprise would be if the Administration decides that it is in the strategic interests of the U.S. to adopt an economy-wide policy of reducing greenhouse gas emissions. Such a policy objective would undoubtedly be accomplished with tradable permits that would include agriculture. If either of these two surprises comes true, then farmers could see significant income possibilities by selling reductions in greenhouse gases.

